Annual AVMA Meeting
Miami Beach, Florida
August 12-16, 1962

Journal

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

Salmonella in Animal By-Products

RESULTS of an extensive survey of *Salmonella* serotypes, their incidence, and their potential for causing disease are described. Page 989

Rabies Immunization in Man

DUCK EMBRYO origin rabies vaccine is shown to be an effective pre-exposure immunizing agent. Page 999

Collecting Prostatic Fluid from Dogs

THIS ILLUSTRATED report describes various surgical techniques for collecting prostatic fluid, including prostatostomy and cystopreputiostomy. Page 1007

Genital Abnormalities of the Cow

INCIDENCE of genital abnormalities, as determined by more than 20,000 examinations, is reported. Page 1015

Vol. 139 November 1, 1961 No. 9

CANINE DISTEMPER-HEPATITIS VACCINE

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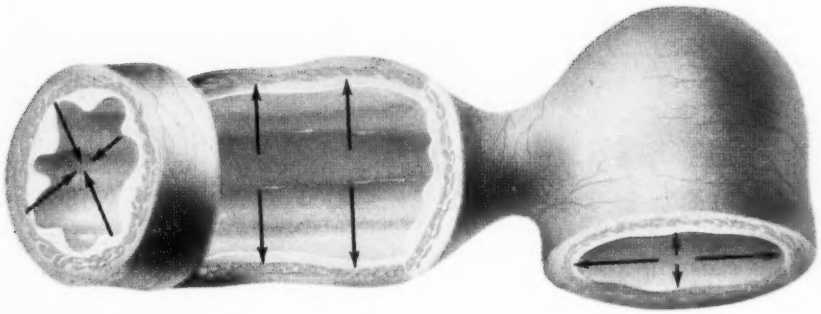

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Journal

OF THE
AMERICAN VETERINARY
MEDICAL ASSOCIATION

Vol. 139 No. 9 November 1, 1961

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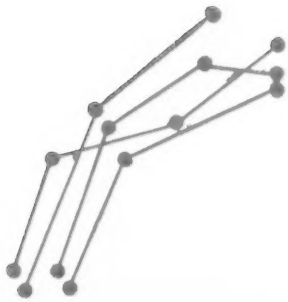

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References: 1. York, C. J.; Bittle, J. L.; Burch, G. R., and Jones, D. E.: Vet. Med. *55*:30 (April) 1960. 2. York, C. J., and Burch, G. R.: J. Am. Vet. M. A. *138*:298 (March 15) 1961.

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Correspondence

Shaken Confidence?

August 9, 1961

Dear Sir:

Your recent editorial (*J.A.V.M.A.*, 139, 1961: 367) was read with particular interest. I am compelled, however, to comment on one statement.

You say, "Furthermore, the apparent success of veterinarians in practice seems to prove that most such products are performing satisfactorily." This is hardly a convincing test of efficacy of biological products. A practicing veterinarian's success is not related to the biological products he uses in any way. For example, many individuals use anti-canine distemper serum routinely, and others use it rarely or never. Yet both groups are successful in their methods. Should one conclude, therefore, that this success is a result of using or not using biological products? Similar examples exist with other biological products, pharmaceuticals, and also practice techniques.

In regard to your comments about "confidence" and relating it to sales figures, I again would like to take exception. Many products are used routinely, not because of real confidence in their efficacy, but rather because they may possibly have some use and the "why take a chance" attitude. Actually, data show that in 1960 there was a 3.8% increase in sales of biological products for small animals but a 12.6% decrease in those for large animals as compared with 1959 figures; and there was an over-all decrease of 3.0% in sales of all veterinary products in 1960. It is also of interest that 56% of all biological sales, exclusive of poultry products, is through outlets *other* than veterinarians.

I have a vague impression that your editorial attempts to support, with a bit of excessive weight, the contention that biological products are of high quality, generally efficient, and biologically sound. Whether the reasons behind a developing lack of confidence include Kefauver and his investigations or not is beside the point. The fact is that there is a growing lack of confidence. Also, one must admit that some products are worthless, and manufacturers themselves will admit this, although not publicly. They will continue to be produced as long as they can be sold, and efficacy does not enter the picture from the producers' standpoint.

Finally, the point about a competitive system is true. I'm all for the system. But I would much rather see the competition based on quality of product than on quantity of sales verbiage. The only stimulation for increasing competition on a quality basis will result from regulatory restrictions requiring high standards.

s/J. E. Prier, D.V.M., Ph.D.
Associate Professor of Virology
University of Pennsylvania

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news from Washington . . .

FROM THE AVMA WASHINGTON OFFICE
J. A. McCallam, VMD
Brig. Gen. USA (Ret.)

COMMITTEE REPORTS

Pension Plans Disclosure Act

Senate Committee on Labor and Public Welfare, having considered a measure to amend the Welfare and Pension Plans Disclosure Act of 1958 with respect to the method of enforcement and providing certain additional sanctions, reported an original bill, *S. 2520*, and recommended its passage. The bill is designed to remedy certain deficiencies in the 1958 Act. The measure would give the Secretary of Labor: (1) full responsibility for insuring full and accurate disclosure of all pertinent details relative to the operation of plans; (2) authority to investigate violations of the act and enforce the statute through injunction in federal courts; (3) require bonding of persons handling plan funds or other plan property; (4) provide for criminal penalties in connection with administration of these plans.

New Urban Affairs Department

Senate Government Operations Committee reported favorably *S. 1633*, as amended, a bill to establish a Department of Urban Affairs and Housing. Would confer Cabinet departmental status on Housing and Home Finance Agency.

Refugee Assistance Act

Senate Foreign Relations Committee, following hearings on *H.R. 8291*, a bill to enable the United States to render assistance to certain refugees, migrants, and escapees, recommended the bill's passage with amendments (Senate Report No. 989), Sept. 12, 1961. This proposed Migration and Refugee Assistance Act of 1961 would:

1) Lift out of the foreign aid legislation, and establish in a separate statute, authority for the President to participate in three programs: (a) contributions to the Intergovernmental Committee for European Migration, (b) contributions to United Nations High Commissioner for Refugees, (c) and U.S. escapee program.

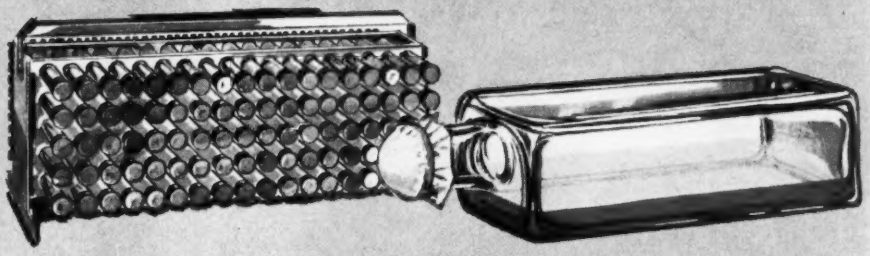
2) Establish specific authority to assist Cuban refugees who have come to the United States. This assistance has been carried out through contingency authority and funds under foreign aid program.

3) Provide the President with authority to meet unexpected refugee and migration problems by using amounts not to

(Continued on page 960)

completely NEW! completely DIFFERENT!

A·B·D·H



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A·B·D·H has a higher concentration of antigenic virus and greater immunizing power than other brands grown on chick embryo or other tissue. Furthermore, there is no chick embryo tissue to cause local or systemic reaction.

Regular dose is 2cc. It is supplied in single dose and package of ten 1-dose vials.

Single vaccines are also available: Affiliated Brand Distemper (**A·B·D**) and Affiliated Brand Hepatitis (**A·B·H**).

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exceed $10,000,000 any fiscal year out of his foreign aid contingency fund. The bill does not change the law pertaining to admission of aliens to the United States.

MISCELLANEOUS

NIH Research Aid

NIH will step up its subsidy for teaching and research. It is consolidating the senior fellowship, career research fellowship, and special fellowship grant programs into a more flexible effort called "Research Career Award Program." This will mean more aid to postdoctoral teachers and scientific investigators in nonprofit institutions. Requests for application forms or information should be directed to: Chief, Career Development Review Branch, Division of Research Grants, National Institutes of Health, Bethesda 14, Md.

PHS Surgeon General

Dr. James Watt leaves as director, National Heart Institute, to head the international health division in PHS Surgeon General's Office, HEW.

Resources for Cancer Research

Surgeon General Luther Terry has announced the establishment of a virology resources branch in the National Cancer Institute. It will assist in providing research materials, collecting normal and malignant human tissue for scientific investigation, and producing and packaging detection agents. Dr. Harvey Scudder heads the branch.

Liability Insurance for AVMA Members

The policy, which was developed especially for Association members two decades ago, provides expert defense against claims and suits arising out of the care and treatment of animals, and will pay, to the extent of the policy limits, all expenses and damages resulting from unfavorable verdicts.

In this suit-conscious age, such protection is not only wise but, as shown by the claim files, a practical necessity.

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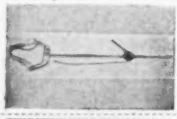

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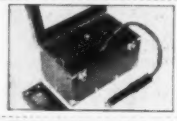

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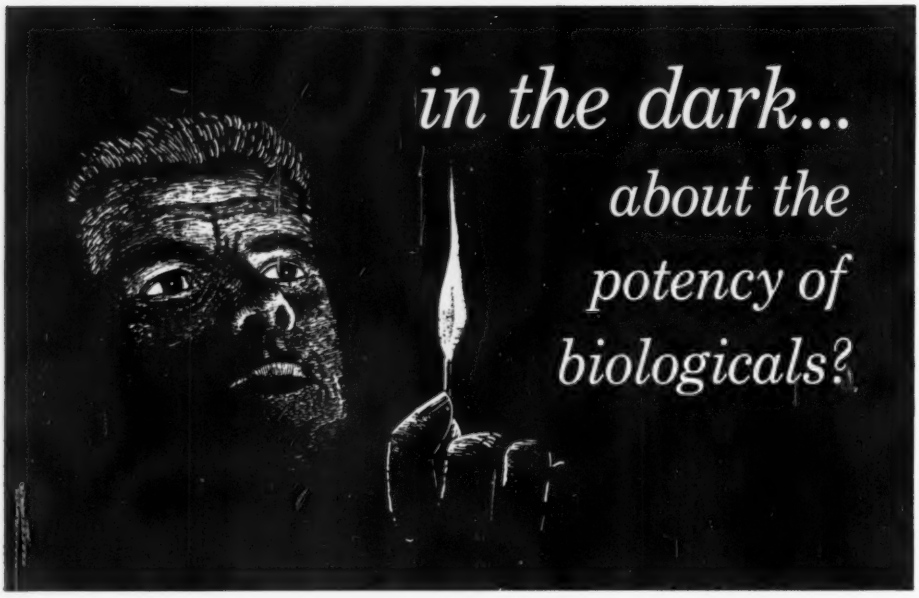

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Introduction

Mastalone is a unique, balanced formulation of effective antibiotics and a potent anti-inflammatory corticosteroid developed for intramammary use. Its special combination of ingredients is effective in the treatment of almost all known types of bacterial infectious bovine mastitis. Each 10 cc. of Mastalone contains the following active ingredients in a suitable base:

Oxytetracycline as the hydrochloride	200 mg.
Oleandomycin base	100 mg.
Neomycin as the sulfate	100 mg.
Prednisolone	5 mg.

Oxytetracycline HCl:

A broad-spectrum antibiotic effective against many gram-positive and gram-negative bacteria (both aerobic and anaerobic), spirochetes, rickettsiae, and certain large viruses.

Oleandomycin:

An antibiotic particularly effective against gram-positive organisms – including many penicillin-resistant staphylococci and streptococci.

Neomycin:

Similar to streptomycin in chemical and pharmacological properties, but demonstrating a wider spectrum of antibacterial activity, including many streptomycin-resistant organisms and problem bacteria of the Proteus and Pseudomonas groups.

Prednisolone:

A highly potent anti-inflammatory agent three to four times as potent as hydrocortisone but with significantly

reduced tendencies to produce untoward side effects such as fluid and sodium retention, potassium depletion, and other hormonal and metabolic disturbances associated with earlier corticosteroids. By reducing inflammatory changes such as swelling and edema, prednisolone may facilitate the introduction of antibiotic activity to previously inaccessible areas of the diseased udder.

Indications

Mastalone is indicated in the treatment of acute and chronic mastitis caused by or associated with organisms susceptible to the antibiotic activity of oxytetracycline, neomycin, and oleandomycin. Mastalone's unique formulation of antimicrobial and anti-inflammatory agents offers in a convenient dosage form, a product that is effective against almost all known types of bacterial infectious bovine mastitis. The major objective in the treatment of infectious bovine mastitis is to effectively eliminate the active infection as rapidly and as economically as possible while preventing permanent damage to the mammary tissues. Mastalone has been developed to meet this objective.

Dosage

The entire contents of one tube of Mastalone (10 cc.) should be infused into each infected quarter immediately after milking. To reduce recurrence of the disease, treatment should be continued for 48 hours after symptoms have disappeared. Where systemic involvement is evident, parenteral antibiotics (such as an injectable form of oxytetracycline) and supportive therapy are recommended in addition to the local (intramammary) infusion with Mastalone.

Field Reports

Field reports indicate that one of the greatest problems in treating acute and subacute clinical mastitis is the resistance of certain bacteria, especially staphylococci, to penicillin and various chemotherapeutic agents. Because of this situation, treatment results are often inconsistent.

One major advantage of Mastalone lies in its broader scope of activity against those strains of bacteria which may have built up resistance to the effect of penicillin and dihydrostreptomycin or those bacteria against which these antibiotics may never have been effective. Mastalone has been found to be effective in the treatment of acute and subacute clinical mastitis, and most important, it's been shown to give *consistent results* in a great number of reported cases.

No Penicillin Residues

Research data indicate that Mastalone milks out of the udder within 72 hours . . . and there's no problem of penicillin residues or penicillin resistance.

Warning

Milk taken from dairy animals within 72 hours after the last treatment for mastitis must not be used for food.

Mastalone Clinical Summary

In a series of 287 cases treated with Mastalone, clinical investigators, veterinarians in Wisconsin, Illinois, Indiana and New York reported to the Department of Veterinary Medicine that Mastalone produced favorable results in most cases, with no undesirable side effects. Most reported Mastalone convenient to use, free-flowing—even in cold weather. Some of these cases are summarized below.

MASTALONE CLINICAL SUMMARY

Diagnosis	No. Animals Treated	Treatment	Investigator's Results and Remarks	Investigator
Acute and chronic clinical mastitis; laboratory confirmed.	20	10 cc. Mastalone; repeated in 24 hours.	Favorable results noticed in 36 to 48 hours in early cases; some improvement noticed even in chronic cases. No undesirable effects.	Illinois C-13-221
Acute, subacute, and chronic clinical mastitis.	12	10 cc. Mastalone.	Recovery of acute cases in 48-72 hours; recovery of subacute cases in 24-48 hours. No dramatic improvements in chronic cases. No undesirable side effects.	Illinois C-13-228
Acute clinical mastitis.	35	10 cc. Mastalone; in some cases repeated in 24 to 36 hours.	Recovery, as indicated by reduced inflammation and improvement in color and consistency of milk, observed in 24 to 36 hours. Results consistently good; no undesirable side effects. Mastalone is free flowing and was convenient to use, even in cold weather.	Illinois C-13-226
Chronic clinical mastitis.	8	10 cc. Mastalone; in some cases repeated in 24 hours.	Five cases made satisfactory recovery; 3 cases incurable with any treatment.	Illinois C-13-233
Acute and chronic clinical mastitis.	6	10 cc. Mastalone every 12 hours.	Improvement noted in 24 hours in 5 cases; full recovery in 72 hours. No response in 1 case of chronic mastitis.	Illinois C-13-235
Clinical mastitis.	25	10 cc. Mastalone; repeated in 24 hours in some cases.	Recovery in 24 to 48 hours. Results were better than other therapeutic agents used; no undesirable side effects.	Illinois C-13-238
Streptococcal clinical mastitis; laboratory confirmed.	6	10 cc. Mastalone.	Improvement of condition was satisfactory 24 hours after treatment; further treatment was not considered necessary.	Illinois C-13-402
Acute and subacute clinical mastitis.	70	10 cc. Mastalone every 24 hours until recovered with maximum of 4 treatments.	Excellent response in 24 hours; recovery in 24 to 48 hours. Mastalone gives more consistent results and seems to be effective in more types of cases than other therapeutic mastitis agents.	Illinois C-13-239-A C-13-239-B C-13-239-C C-13-239-D
Infectious mastitis; laboratory confirmed.	8	10 cc. Mastalone, 3 treatments at 12 hour intervals.	Treatment satisfactory in 6 cases; repeated in 2 cases.	Illinois C-13-503
Clinical mastitis.	15	10 cc. Mastalone every 12 hours until recovered.	Results noted in 12 to 36 hours. Appears to be superior to other products, especially in severely swollen udders; also seems to have a broader range of effectiveness.	Indiana C-13-299
Clinical mastitis.	7	10 cc. Mastalone every 12 to 24 hours for one to three days.	Response good to excellent. Most cases cleared up in 2 days.	Indiana C-13-299-C
Subclinical staphylococcal mastitis; laboratory confirmed.	9	10 cc. Mastalone repeated in 48 hours.	Seven out of the 9 cases were negative for staphylococci on follow-up laboratory study after 2 treatments with Mastalone.	New York C-13-950

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Mastalone is available in 10-cc. metal tubes—12 tubes per carton, and 12 cartons per shipper. Quantity prices are available. Use this special order form when you order your supply.

Brand of oxytetracycline hydrochloride, oleandomycin, neomycin sulfate, prednisolone (Sterane®) in a special base.

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Quantity	Unit Price*	Carton Price*	How Many?
1-71	0.81	9.72	_____
72-143	0.79	9.48	_____
144 and over	0.75	9.00	_____

*Qualified orders shipped direct will be billed at prices listed in current *Direct Veterinarian Price List*.

Cine-Clinic and Longer Meeting Planned for Next Year's Convention

Wheels have already been set into motion to get next year's convention on the road.

The starting point was reached when AVMA section officers met at the central office in Chicago on September 27 to plan scientific sections for the Miami Beach meeting.

Two full days of cine-clinic were planned. These will be staged on the first day (Monday), featuring large animal medicine and small animal medicine, and on the third day (Wednesday), featuring public health topics in the morning, and regulatory veterinary medicine in the afternoon.

Other features planned for next year's meeting include a half day devoted to laboratory animal diseases. This session will be co-planned by the sections on public health, research, and small animal medicine.

Section officers were told at their meeting that the AVMA House of Delegates will meet for three days at next year's convention. The House previously met for two days, Saturday and Sunday, but delegates in Detroit expressed the feeling that two days did not give them adequate time to handle Association affairs. House meetings will be scheduled for Saturday, Sunday, and Monday at the Miami Beach meeting.

The section officers will now begin planning scientific programs for their sections and issuing invitations to speakers. Invitations will have been issued and a tentative program drawn up by Jan. 1, 1962. Suggestions or offers of participation in the pro-

Participants in the meeting of AVMA section officers are shown here. They are (standing, left to right): Drs. R. G. Schirmer, small animals; R. F. Langham, research; R. C. Vierheller, small animals; B. R. Burmester, poultry; A. L. Kleckner, poultry; J. A. Henderson, Executive Board member; and Les Fisher, Berwyn, Ill. (Seated, left to right): Drs. F. J. Mulhern, regulatory veterinary medicine; C. L. Campbell, regulatory veterinary medicine; C. T. Caraway, public health; J. H. Steele, public health; D. A. Price, AVMA editor-in-chief; Arthur Freeman, AVMA assistant editor; L. E. Boley, large animals; D. F. Walker, large animals; M. G. Fincher, large animals; and W. L. Sippel, research. Not shown are Drs. George Young, small animals, and Leslie Murphy, public health.

gram should be sent to section secretaries as early in November as possible.

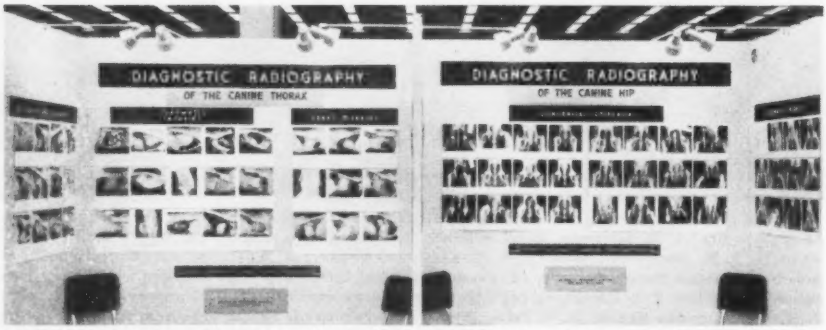
Meeting with the section officers at their meeting September 27 were Mr. Wally Simms, Pitman-Moore liaison representative for closed circuit television sponsorship at the AVMA conventions, and Dr. Les Fisher (ISU '43), Berwyn, Ill., moderator of the AVMA closed circuit television programs for 10 years. Dr. James A. Henderson (ONT '36), AVMA Executive Board member, also attended. Staff members present to offer guidance to section officers when needed were Dr. H. E. Kingman, Jr., executive secretary; Dr. D. A. Price, editor-in-chief; Dr. Arthur Freeman, assistant editor; and Mr. Russell Rongren, business manager.

AVMA section secretaries are: Section on Research—Dr. William L. Sippel, Florida Livestock Board, Kissimmee, Fla.; Section on Public Health—Dr. Charles T. Caraway, State Department of Health, New Orleans, La.; Section on Regulatory Veterinary Medicine—Dr. F. J. Mulhern, USDA Agricultural Research Service, Animal Disease Eradication Division, Washington, D.C.; Section on Small Animals—Dr. R. C. Vierheller, Whittier Dog and Cat Hospital, 907 W. Philadelphia St., Whittier, Calif.; Section on Large Animals—Dr. M. G. Fincher, New York State Veterinary College, Cornell University, Ithaca, N.Y.; and Section on Poultry—Dr. A. L. Kleckner, Department of Veterinary Hygiene, University of Georgia, Athens, Ga.

Scientific Displays at AVMA Convention in Detroit

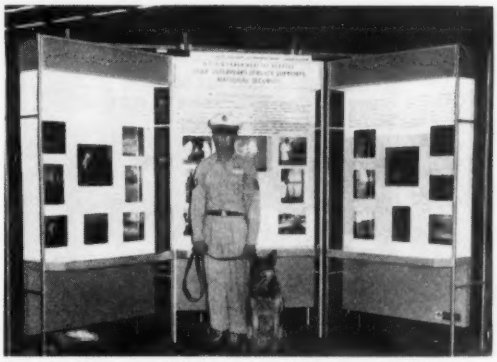
For those interested in television as a teaching aid, a demonstration on television in the classroom was sponsored by the College of Veterinary Medicine at Michigan State University.

Fully one-third of the scientific exhibits displayed at the 98th Annual Meeting of the AVMA at Detroit dealt with small animal subjects such as joint diseases, diagnostic radiography, elbow dysplasia, histoplasmosis, blastomycosis, and physiology. Eight exhibits were sponsored by universities and their faculty members. Government services including the USDA, Army, Air Force, and U.S. Public Health Service sponsored exhibits dealing with screwworms, brucellosis, tuberculosis, poultry inspection, meat inspection, bioastronautics, and sentry dogs. Three exhibits pertained to application of laboratory animals to research. Three exhibits were sponsored by commercial firms.



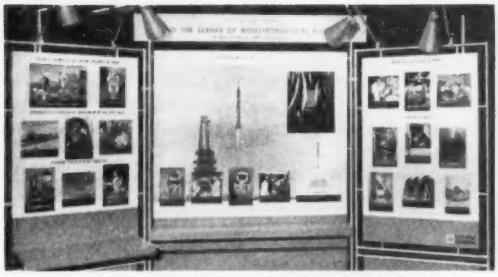
Extensive display on diagnostic radiography prepared by Drs. Maksic and Small of the University of Illinois provided practical diagnostic visual aids concerning pneumonic diseases, traumatic injuries, dysplasias, and heart diseases in dogs.

Exhibit on experimental production of emphysema was a timely display on comparative medicine. Chronic pulmonary emphysema in the horse is similar to this disease in man.



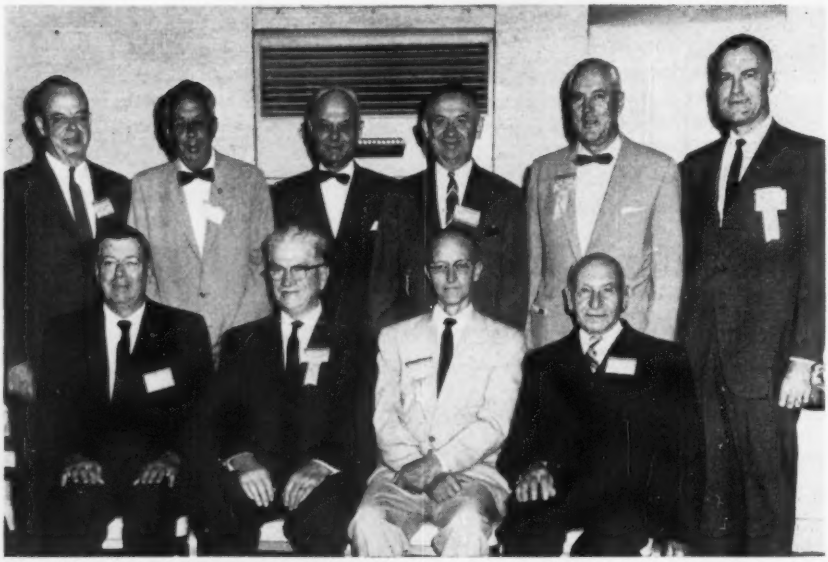
The Air Force, in addition to furnishing an exhibit on sentry dogs, gave public demonstrations with dogs for the benefit of conventioneers.

An exhibit on heartworms in the dog was prepared and manned by Dr. Albert Soltys, a practitioner from Nassau, Bahamas. On hand at the exhibit was a dog with heartworm infection which was used to demonstrate the technique for collecting blood samples. Dr. Soltys described his methods of treatment and control and how to differentiate *Dirofilaria* from harmless *Dipetalonema*.



Activities of veterinarians in bioastronautical research are concerned often with laboratory animals. Featured in this exhibit were Ham, the space chimpanzee, and other laboratory primates.

AVMA Officials at Convention



Past and present AVMA officials who attended the convention in Detroit are shown here. They are (standing left to right): Drs. W. A. Hagan, president, 1947-1948; A. H. Quin, president, 1954-1955; J. A. McCallam, president, 1953-1954; S. F. Scheidy, president, 1959-1960; W. O. Kester, president, 1956-1957; and W. W. Armistead, president, 1957-1958. Seated are (left to right): Drs. W. M. Coffee, president, 1950-1951; E. E. Leasure, president, 1960-1961; M. L. Morris, president, 1961-1962; and A. E. Cameron, Executive Board Member, 1932-1947.

Conference of Public Health Veterinarians Meets in Detroit

The annual meeting of the Conference of Public Health Veterinarians was held on Aug. 20, 1961 during the AVMA convention. Approximately 30 members attended.

A discussion was held on the implication, current status, and the official Conference stand on the Moulder Bill, H.R. 3556, and the Griffith's Bill, H.R. 1937. The Conference joined the AVMA and other scientific organizations in opposing these bills as well as any other legislation intended to regulate the use of laboratory animals in biomedical research.

Many favorable comments were made about the recently published book, "Comparative Medicine in Transition." This is a treatise on the broad aspects of veterinary public health.

Another publication extolling the veterinary profession is the Humphrey Committee Print No. 11 entitled, "Veterinary Medical Science and Human Health." Some statements in the report the Conference particularly noted were:

"The profession of veterinary medicine is worthy of the admiration and the appreciation of the people of the United States and of other nations. It has been characterized by high ideals. Its professional societies have made constant efforts to improve their service to man through advancing the health of the animal population."

"In an age of high-speed transportation of man and animals, federal and state governments are confronted with the rising challenge, once disease breaks out, of combating its quick spread across state lines, or, in the case of diseases abroad, their introduction into the United States."

"Veterinary medical research is an indispensable element of research in problems of human health. Veterinarians have contributed countless valuable discoveries which have, by accident or design, proved applica-

ble sooner or later in improving the health of man. No artificial boundary can or should be maintained between study of the processes of life as they relate to humans or animals. Nature is a unity. Science is a unity."

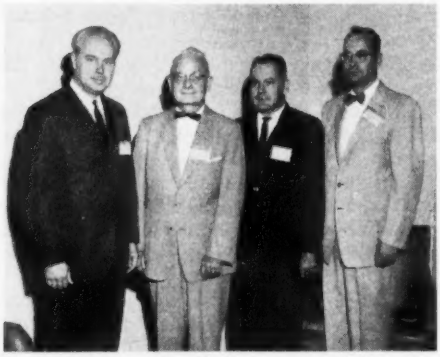
Also at the meeting of the Conference of Public Health Veterinarians, a report was presented on the current status of the project to create a veterinary or comparative medicine section within the American Public Health Association. Favorable consideration by the executive staff of the APHA has been given to this project. The Conference felt it is important for veterinarians to be a part of this national body whose interests parallel those of both the veterinary clinician as well as public health and military veterinarians.

The tentative program to be presented by the Conference in conjunction with the annual meeting of the APHA was considered by Conference members.

Grants Presented at AAVA Meeting

Four National Science Foundation grants were presented at the meeting of the American Association of Veterinary Anatomists in Detroit.

The grants are to help defray the expenses of four veterinarians who are going to Vienna, Austria, for the meeting of the World Association of Veterinary Anatomists. At the World Association meeting, these men will present the finalized and summarized nomenclature report to the convention.



National Science Foundation grant recipients are shown here. They are (left to right): Drs. Robert Getty, T. C. Fitzgerald, Larry St. Clair, and George Christensen.

Grant recipients are: Drs. T. C. Fitzgerald (OSU '28), Auburn, Ala., president of the American Association of Veterinary Anatomists; Robert Getty (OSU '40), Ames, Iowa, president-elect; George Christensen (COR '49), Lafayette, Ind., secretary-treasurer; and Larry St. Clair (COL '35), Urbana, Ill., chairman, nomenclature committee.

University of Missouri Holds Interprofessional Seminar

An interprofessional seminar on rabies, leptospirosis, and histoplasmosis was recently held at the University of Missouri Medical Center.

It was attended by more than 100 veterinarians, physicians, laboratory workers, students, and faculty members.

In a statement of purpose appearing in the program for the meeting it was pointed out that, "All too frequently we go our separate ways in studying disease. As a result we often fail to appreciate the broader perspectives of disease whose impact extends across many disciplines. To help bridge this gap this interprofessional seminar was arranged."

Dr. A. H. Groth, dean of the School of Veterinary Medicine at the university said, "This was what we hope will be the first of several meetings of this sort."

North Dakota V.M.A. Seeks Funds from Legislature

All veterinarians in North Dakota are being urged to contact their legislators and to request that funds to help defray expenses of North Dakota veterinary students attending colleges in other states be restored at the next legislative session.

The 1961 Legislative Assembly of North Dakota did not appropriate funds this year. The association feels that North Dakota is not in a position to establish a veterinary college and so the funds should be made available.

Dr. D. F. Eveleth (ISU '34), president, has appointed a committee to coordinate a campaign toward this end. Committee members are: Drs. G. M. Christensen (COR '51), Minot; L. G. Best (COL '50), Wahpeton; and K. E. Adamsons (LAT '41), Medina.

Interdisciplinary Science Points Way to Progress

The Colleges of Veterinary Medicine and Engineering at Iowa State University have joined hands and are working together toward progress in a new interdisciplinary field—biomedical electronics.

The program at Iowa State University was begun in 1957. Until that time, except for a few isolated contributions, the broad biomedical concepts of naturally developed information systems remained unavailable to the engineer, and the powerful analytical tools of the engineer remained unavailable to the biomedical research worker. Concepts of medical instrumentation, and mathematical treatments of medical phenomena were largely limited to the traditional approach of biophysics and biochemistry.

For several years before 1957, individual staff members at Iowa State University had been exploring the possibilities of improving technical communication between the engineering and biomedical professions. Through seminar lectures, laboratory demonstrations, and numerous conferences, graduate students and faculty members were advised of the possibilities of a cooperative approach to the problem of biomedical instrumentation. Several pilot experiments were launched cooperatively by the Colleges of Veterinary Medicine and Engineering such as the determination of the minimum electrical energy for sciatic nerve stimulation and the design of an ultrasafe and simple cardiac defibrillator. The results of these and several other cooperative efforts were so encouraging that the University decided to enlarge the scope of the program.

Today, four years later, the program is in full swing. During the 1960 to 1961 academic year, more than 12 graduate students were engaged in the program. It offers training for veterinary medicine students specializing in advanced methods of using modern instruments for the solution of medical research problems. For engineers, training is offered in advanced methods of designing instruments for biomedical measurements and in applying engineering principles and methods to basic medical phenomena. Graduate minors in biomedical electronics are offered at both the M.S. and Ph.D. levels.

The goal of the program is the design of equipment for detecting biologic changes, the improvement of present instruments, and the evaluation of results by quantitative methods. The research and training program is supported by grants and Iowa State University contributions.

Since its inception in 1957 the biomedical electronics program has been administered with equal responsibility by the College of Engineering and the College of Veterinary Medicine. Responsibility for day-to-day guidance of the program rests with an administrative committee composed of six senior faculty members. These are the associate director of the Engineering Experiment Station, the associate director of the Veterinary Medical Research Institute, the head of the Department of Electrical Engineering, the head of the Department of Veterinary Anatomy, the head of the Department of Veterinary Physiology and Pharmacology, and the chairman of Biomedical Electronics.

The research portion of the program applies the technical knowledge of the members of all the cooperating departments to develop and refine instruments for making biomedical measurements as well as utilizing electronic means in therapy and diagnosis.

Primary objectives of the research program are:

1) Advanced design of instruments for biologic and medical measurements.

2) Advanced instrumentation methods for solving biologic and medical research problems.

3) Applications of feedback theory to the study of physiologic functions.

4) Applications of information theory to the study of anatomic structures and functions.

5) Applications of biologic concepts to the design of self-organizing data systems.

Research projects will be carried out through the biomedical electronics program in such areas as medical instrumentation and radio telemetry, medical automation and data analysis, hormone feedback theory and pharmacodynamics, symbiosis of natural and artificial systems, and gerontologic, neurologic, and cardiovascular research.

In its first four years, the program has been carried out in facilities of the cooperating departments. Now under construction is a new $407,500 biomedical electronics laboratory building adjacent to the Veterinary Medicine Quadrangle. Funds from the state

of Iowa and the U.S. Public Health Service were used for the building. It will include an electronics shop, small animal quarters, a fully shielded and instrumented surgery room, radiotracer laboratories, drug and chemical rooms, and research laboratory space.

Dr. Ival A. Merchant, dean of the College of Veterinary Medicine at Iowa State University, says of the interdisciplinary program: "From the medical viewpoint, we are pleased to find that training and experience in the basic medical sciences have potential value in engineering. We appreciate the contributions which engineers have made toward some important instrumentation problems in veterinary medicine.

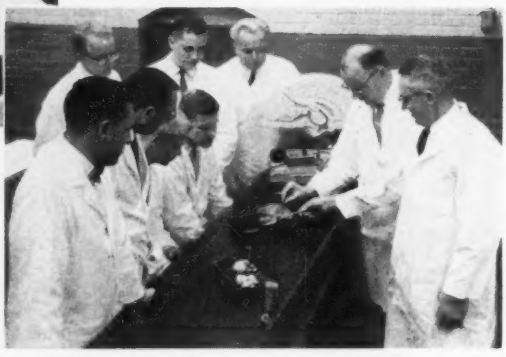
"Special electronics courses taken by some of our graduate students have enabled them to develop more refined methods of measuring medical functions.

"We also have found that engineering methods of analysis often can be employed to advantage in medical research problems. Examples of this are the use of information theory to describe genetic phenomena and the use of servomechanism theory to investigate physiological homeostasis and its pathological variations."

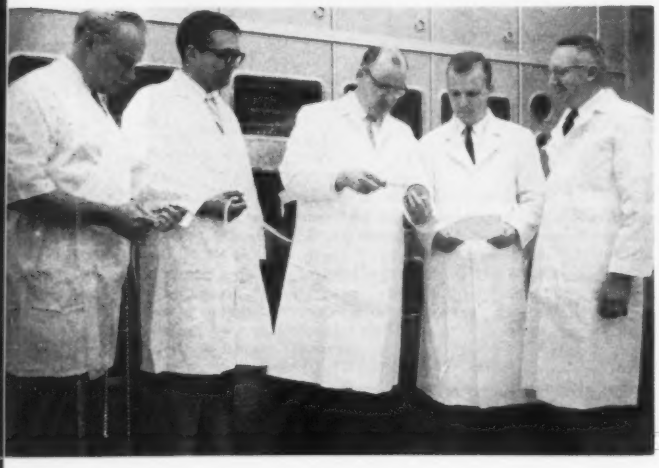
Similarly, the College of Engineering finds value for its students in special courses of instruction in basic medical sciences and participation in the solution of biologic and medical research problems. Such courses prepare engineers for research in the regulation of limited environments and the telemetering of physiologic data in space technology.

Dr. Neal Cholvin (MSU '54, right) implants a transducer around the abdominal aorta of a dog for research on the cardiovascular system. A member of the Michigan State University veterinary staff on leave of absence, Dr. Cholvin is completing the research work for the Ph.D. degree in veterinary physiology. One of his minor fields of study was electrical engineering, and his research is strongly tied to the Iowa State biomedical electronics program. His research is supported by the National Institutes of Health. The work of Dr. Cholvin seeks to develop a dependable system of monitoring cardiovascular functions. The implanted transducer will enable veterinarians at Iowa State to observe circulatory functions over an extended period of time. Working with Dr. Cholvin in this surgical implant is Lester Reschly (left), veterinary medicine student.

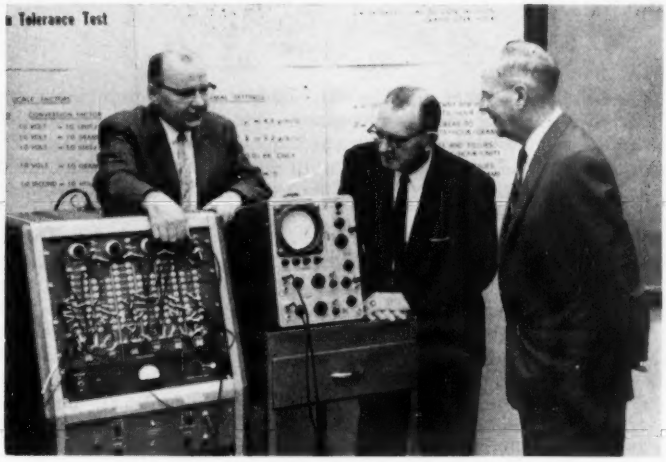
Multiple channel physiologic recorder is used to record information on heart sounds, electrocardiogram, respiratory rate, and pulse waves in the aorta. The dog is equipped with an implanted transducer and an electrical connector in its back. An amplifier strengthens signals from the transducer so that physiograph can pick them up for recording. Dr. Cholvin (right) and Lester Reschly are conducting the recording.



Six electrical engineers currently studying neuroanatomy receive instruction on the brain from Dr. Melvin J. Swenson (right), head of veterinary physiology and pharmacology; Dr. Victor W. Bolie (2nd from right), chairman of the biomedical electronics program, and Dr. Robert Getty (center), head of veterinary anatomy.



Tape containing mathematical formulas of a theoretical analysis and the answers supplied by the digital computer are viewed by personnel engaged in the Iowa State University biomedical electronics program. From left to right are: Dr. Robert Getty (OSU '40), head of veterinary anatomy; Robert Bellles, instructor in veterinary physiology and pharmacology; Dr. Victor W. Bolie (holding tape), professor in electrical engineering, veterinary anatomy and physiology, who is chairman of the biomedical electronics program committee; Dr. Neal Cholvin (holding computer data sheet), graduate student in veterinary physiology; and Dr. Melvin J. Swenson (KSU '43), head of veterinary physiology and pharmacology.



Iowa State University's biomedical electronics program is conducted by the College of Veterinary Medicine and College of Engineering. Principal administrators of the program are shown here with an analog computer used in insulin glucose feedback studies. From left to right are Dr. Victor W. Bolie, chairman of the program; Dean I. A. Merchant (COL '24), College of Veterinary Medicine, and Dean George Town, College of Engineering.

Dr. I. B. Boughton Officially Retires

Dr. I. B. Boughton (OSU '16), formerly dean of the School of Veterinary Medicine, A. & M. College of Texas, officially retired Aug. 31, 1961.

Approximately 50 members of the faculty and staff of the school honored him with a dinner.

Association of Military Surgeons To Meet

The Association of Military Surgeons of the United States will hold its 68th annual meeting on Nov. 6-8, 1961, at the Mayflower Hotel in Washington, D.C.

The Veterinary Section of the association will meet on November 7 from 2:30 to 5:00 p.m. Reserve officers attending any scientific session of the meeting will be eligible for point credits.

Four presentations will be given during the veterinary session. They are: "Comparative Medicine in Public Health," by Dr. James H. Steele (MSU '41), chief, Veterinary Public Health, Communicable Disease Center, Atlanta, Ga.; "Uveal and Retinal Lesions in the Dog and Cat," by Dr. Lionel F. Rubin (UP '54), Public Health Service Special Fellow, University of Pennsylvania School of Veterinary Medicine; "Epidemiology of Leptospirosis (*L. pomona*) in Iowa," by Dr. Richard A. Tjalma (MSU '54), chief, Epizoology Section, Epidemiology Branch, NCI, National Institutes of Health; and "The Problems and Implications of Animal Cancer Viruses," by Dr. Robert J. Huebner, chief, Laboratory of Infectious Diseases, NIAID, National Institutes of Health.

National Swine Industry Conference Slated

The National Swine Industry Conference will be held in St. Louis, Mo., November 9 and 10. The Conference theme will be Progress—past and future.

A number of veterinarians will appear on the program and Dr. James R. Hay will represent the AVMA.

In addition to reports to be presented at the meeting, ten workshop sessions will be held. The workshop sessions will be on How Can We Improve the Demand for Pork, Breeding and Reproduction, Artificial Insemination, Educational Needs of Swine Producers, Hog Cholera Eradication, Marketing of Live Hogs, Swine Brucellosis, Feeder Pig Production, A Swine Disease Prevention Program, and Equipment and Manure Handling.

Veterinarians to appear on the program and their presentations are:

Dr. F. J. Mulhern (AUB '45), USDA Washington, D.C., "Let's Move on Hog Cholera Eradication," and a panel participant in the Hog Cholera Eradication Workshop.

Dr. W. H. Dreher (ISU '40), Badger Breeders Cooperative, Shawano, Wis., chairman of workshop session on Artificial Insemination.

Dr. George Johnson, Ohio State University, "Results of the Swine Artificial Insemination Field Trials in Ohio," Artificial Insemination Workshop.

Mr. Charles Greene, Serum Control Agency, White Hall, Ill., panel participant in the Hog Cholera Eradication Workshop.

Dr. H. G. Geyer (OSU '36), Columbus, Ohio, U.S. Livestock Sanitary Association, panel participant in the Hog Cholera Eradication Workshop.

Dr. James H. Steele (MSU '41), Communicable Disease Center, Atlanta, Ga., "Swine Brucellosis as a Public Health Problem," Swine Brucellosis Workshop.

Drs. C. K. Mingle (OSU '30), USDA, and Sam McNutt (ISU '17), University of Wisconsin, "Swine Brucellosis; Control and Eradication," Swine Brucellosis Workshop.

Dr. J. D. Ray (KCV '17), Affiliated Laboratories Corporation, White Hall, Ill., "Some Aspects of Swine Disease Prevention," A Swine Disease Prevention Program Workshop.

Dr. A. H. Jensen, University of Illinois, "The Specific Pathogen Free Program and Swine Disease Prevention," A Swine Disease Prevention Program Workshop.

AVMA Fellow's Wife to Head Fund-Raising Campaign

Mrs. William G. Magrane, wife of a former AVMA Research Fellow, will act as general chairman for the Women's Auxiliary to the AVMA's fund drive for the AVMA Fellowship Program.

Through the fund drive, the Women's Auxiliary hopes to raise $100,000 in the coming year for the support of AVMA fellows. Last year, the first year the Auxiliary served as AVMA's official fund raisers, they raised more than $50,000 for the Fellowship Program.

Mrs. Magrane will coordinate the activities of the district directors and disseminate information and supplies prepared at the AVMA central office to them. Directors have been appointed for each AVMA Executive Board District in the United States.

District directors and the quota assigned to each district are: District I, Mrs. C. E. DeCamp, $9,700; District II, Mrs. S. F. Scheidy, $10,950; District III, Mrs. W. C. Cook, $10,700; District IV, Mrs. H. H. Sutton, $10,600; District V, Mrs. F. R. Booth, $12,200; District VI, Mrs. L. H. Bell, $8,700; District VII, Mrs. K. M. Curtis, $6,400; District VIII, Mrs. C. T. Mason, $6,600; District IX, Mrs. Earl Leslie, $9,050; District X, Dr. Ernestine Payen, $10,700; and District XI, Mrs. J. D. Stevens, $5,400.

Dr. N. B. King Goes to Italy

Dr. Nelson B. King (OSU '48), Department of Veterinary Science, Ohio Agricultural Experiment Station, is on a year-long leave of absence to assist with the program of the Animal Health Branch, Animal Production and Health Division, Food and Agriculture Organization of the United Nations, with headquarters in Rome, Italy.

Swine Brucellosis Eradication Program Intensified

A new phase of the brucellosis eradication program—an intensified effort to eradicate swine brucellosis—is under way.

The nationwide swine brucellosis eradication program will be carried out jointly by the states and the USDA.

Three reasons for the program were cited by Dr. C. K. Mingle (OSU '30), head of brucellosis eradication work for USDA's Agricultural Research Service. "First of all," he pointed out, "swine brucellosis costs the swine industry about $10 million a year. Second, this disease presents a threat of cross-infection to cattle. Third—and highly important—it is a serious hazard to human health."

In the past, Dr. Mingle explained, most cases of human brucellosis, or undulant fever, were contracted from cattle infected with the bovine form of brucellosis. "But

now," he said, "the main source of human infection is diseased hogs." Last year, for instance, 65% of all the reported cases of human brucellosis were thought to be of swine origin—compared to 40% only three years ago." (In 1959, the last year for which complete figures were available, there were 892 cases of human brucellosis.)

The first stage of this intensified swine brucellosis program is based on the "validation" of individual swine herds as brucellosis-free. Validation is achieved by following procedures recommended by the U.S. Livestock Sanitary Association and approved by USDA and cooperating states. Herds are validated for one year after all adult animals pass two consecutive negative blood tests. When a herd qualifies, the owner is supplied with an appropriate sign bearing the symbol of validation and identifying his herd as a source of brucellosis-free hogs.

Because signs of swine brucellosis vary greatly and often resemble other conditions, the disease exists in many herds without being suspected. Dr. Mingle warned hog producers not to wait for signs to appear. "Regular blood testing of all adult animals," he emphasized, "is the only positive way to detect infection."

Iowa State University Announces More Faculty Additions

Iowa State University, College of Veterinary Medicine, has announced two more additions to the faculty.

They are Dr. J. Robert Duncan (GA '59), assistant professor in the Department of Pathology, and Dr. Jerry P. Kunesh (ISU '61), instructor in the Department of Medicine and Surgery.

Purdue Receives Grant for Ulcer Study

Approximately $45,000 has been received by two Purdue University veterinarians for a study of gastric ulcers in swine. Drs. G. D. Goetsch (KSU '45) and T. M. Curtin (MIN '54) received the funds from the National Institutes of Health as a three-year research grant.

A recent increase in the seriousness of stomach ulcers observed in swine has been of concern to the swine industry and of interest to investigators of this condition in man. The investigation at Purdue will be concerned with the cause, development, and effects of the condition in swine. The results of this study will not only provide direct benefit to the swine industry, but may provide new ideas for the treatment and prevention of stomach ulcers in man.

Dr. Goetsch is head of the Department of Physiology and Pharmacology in the School of Veterinary Science and Medicine. Dr. Curtin has held the position of extension veterinarian since 1958. He has resigned that position to devote more time to the ulcer studies. He is presently in the Department of Physiology and Pharmacology as a National Institutes of Health postdoctoral fellow.

New Practice Act Becomes Law in Wisconsin

A new Veterinary Practice Act became law in Wisconsin when Governor Gaylord Nelson signed Bill 350-A on July 24, 1961.

Bill 350-A completely rewrote the Veterinary Practice Act of Wisconsin. It spelled out in detail who shall and shall not practice veterinary medicine in that state. For the first time, it incorporated veterinary ethics into state statutes. The Wisconsin State Board of Veterinary Examiners now has the power to deny, suspend, or revoke a license for a violation of veterinary ethics.

Bionics Symposium Held at Cornell

Reports on a variety of recent investigations in biologic systems, which may some day serve as prototypes for electronic or mechanical counterparts, drew the attention of both biologic and physical scientists at the Second Annual Bionics Symposium at Cornell University Aug. 30 to Sept. 1, 1961.

The first symposium of this type, held last year in Dayton, Ohio, centered on problems of mathematicians and physical scientists, relating to development of formal and hard-

ware systems which mimic some function or behavior pattern of a living organism. Emphasis at this year's symposium was placed on the role of biology in bionics. Participants explored the full interdisciplinary character of bionics, and those actively engaged in synthetic systems were brought into closer association with the life scientists upon whose work progress in bionics will be based.

Professor M. R. Kare, Department of Veterinary Physiology, Cornell University, was on the technical committee which planned the program. Dr. John H. Whitlock (ISU '34), Department of Veterinary Pathology and Bacteriology, Cornell University, reported on "Bionics and Experimental Epidemiology."

The three-day meeting was sponsored jointly by Cornell University and the General Electric Advanced Electronics Center.

Dr. F. E. Henderson Goes to Puerto Rico

Dr. Forrest E. Henderson (AUB '43) has been appointed veterinarian in charge, Animal Disease Eradication, USDA, San Juan, Puerto Rico, effective Aug. 6, 1961.

Dr. F. E. Henderson

After three years in the Armed Forces, Dr. Henderson entered federal service with the former Bureau of Animal Industry in California, and performed field duties in tuberculosis eradication. In 1948 he went to Mexico on the foot-and-mouth disease eradication program, and in 1952 spent one year at Tulane University, New Orleans, La., where he received the master of public health degree. He then returned to Mexico and in 1957 became co-director of the Mexico-U. S. Commission for the Prevention of Foot-and-Mouth Disease. In June, 1959, he transferred to Sebring, Fla., where he became federal director of the joint State-Federal Screwworm Eradication Program. He served in that capacity until his transfer to Puerto Rico.

In 1956 Dr. Henderson received a USDA cash award and citation for outstanding work in livestock disease eradication in Mexico. He is a member of the AVMA and the National Association of Federal Veterinarians.

Dr. E. L. Love Assigned to Ames

Dr. E. Leland Love has been transferred as veterinarian (microbiology) to the USDA National Animal Disease Laboratory, Ames, Iowa.

Dr. E. L. Love

He entered federal service after graduation from Kansas State with the former Bureau of Animal Industry and became veterinarian in charge of the State-Federal Brucellosis Testing Laboratory, Manhattan, Kan. In July, 1939, he transferred to the Animal Disease Station, Beltsville, Md., and received in-service training until January, 1940, when he was put in charge of production, standardization, and development of *Brucella* strain 19 vaccine. He developed a testing program for evaluating commercial and state-produced liquid and desiccated strain 19 vaccine. He maintained the strain 19 stock culture center and developed a selected culture replacement program for distribution to commercial laboratories, research institutions, and numerous foreign countries engaged in the production of vaccine. He was in charge of the *Brucella* antigen production and control laboratory (the exclusive source of tube, plate, and *Brucella* ring-test antigen, produced to meet the needs of the state-federal nationwide testing program). He participated in the Pan-American Sanitary Bureau Seminar on the production, standardization and testing of *Brucella* antigen in Mexico City for the Central American and Caribbean countries. He assumed duties covering the testing and evaluation of contract mammalian and avian tuberculin and johnin, and served as veterinarian in charge of the Animal Disease Eradication laboratories at Beltsville. He also cooperated in studies with the *Brucella* Research Division of the Animal Disease and Parasite Division on problems of re-

search and development of strain 19 vaccine and antigens.

During the past 20 years he trained foreign personnel from numerous countries in procedures of vaccine and antigen production.

Dr. Love is a member of the AVMA, the Conference of Research Workers in Animal Diseases, and the Kansas State University Alumni Association.

Dr. A. H. Dahl Appointed to Radiology Section at Colorado

Dr. Adrian H. Dahl has been appointed professor of radiation biology in the radiology section of the College of Veterinary Medicine, Colorado State University.

Dr. A. H. Dahl

Dr. Dahl went to Colorado State University from the Oak Ridge (Tenn.) Institute of Nuclear Studies where, since 1959, he was the principal scientist in charge of a course on industrial applications of radioisotopes. He also served a term as acting chief of the Institute's Special Training Division.

Dr. Dahl will be in charge of new courses for a new radiation health training program at Colorado, designed to train radiation protection and control specialists for radiologic health projects in government and industry. The university is one of nine schools throughout the country selected to conduct this work and supported by a $138,240, five-year contract with the U.S. Department of Health, Education and Welfare.

For ten years before joining the Oak Ridge Institute, Dr. Dahl was chief of the radiation physics section at the University of Rochester Medical School, Rochester, N.Y. He taught courses in basic radiation detection electronics, and atomic and nuclear physics, and he designed laboratory equipment and experiments for the courses. He also designed and maintained much of the radiation detection equipment used in research work at the medical center.

During his term at Rochester, Dr. Dahl served as consultant to the Federal Civil Defense Administration in establishing its education program in radiological defense.

He received a B.A. degree in physics, chemistry, and mathematics at St. Olaf College, Northfield, Minn., and a Ph.D. in biophysics from the University of Rochester.

Dr. R. J. Keller Appointed to Washington

Dr. Robert J. Keller (COL '44) has recently been promoted to a staff position in the Plants and Equipment Office of the Meat Inspection Division of the USDA in Washington, D.C. He went to his post from St. Louis, Mo., where he served in a supervisory capacity.

Dr. Robert J. Keller

Dr. Keller entered duty with the division at Oklahoma City, Okla., in 1953. He later transferred to St. Louis where he remained from 1957 until his transfer to Washington.

Dr. S. D. Culver Receives USDA Award

Dr. Sylvan D. Culver (AUB '36), a field veterinarian with the USDA animal disease research unit at Auburn, Ala., is the recipient of a $300 cash award and a certificate of merit.

Dr. S. D. Culver

The honors came to Dr. Culver for "sustained outstanding work performance in connection with contributions and services which have increased the scope and effectiveness of animal disease eradication programs in the state of Alabama. His unusual energy and determination beyond his job expectations has resulted in a high degree of cooperation from local interest in the several programs of animal disease eradication."

The quote is from a citation directed to him by Dr. B. T. Shaw, administrator, USDA Research Service in Washington, D.C.

Dr. B. N. Lauderdale (AUB '17), Montgomery, veterinarian-in-charge of the local unit, said in making his recommendation of Dr. Culver for the award that it was the first to be submitted from Alabama in the Animal Disease Eradication Division.

In his recommendation Dr. Lauderdale pointed out that Dr. Culver has made outstanding progress in his work as supervisory veterinary livestock inspector in the 17 northeast Alabama counties that compose his district. "He has discharged his responsibilities and has exercised powers of observation and judgement in making program adjustments and decisions which exceeded requirements for the position."

In addition Dr. Culver plans and conducts animal disease eradication and control activities with Auburn University and Tuskegee Institute as part of his duties. He has been engaged with the USDA animal disease eradication program almost continuously since he graduated from Auburn.

Dr. L. N. Miller, Jr., Given Baltimore Post

Dr. L. N. Miller, Jr. (AUB '49) has been appointed veterinarian in charge, USDA Animal Disease Eradication station, Baltimore, Md., effective Aug. 13, 1961.

Dr. L. N. Miller, Jr.

He was formerly veterinarian in charge of the animal disease activities in San Juan, Puerto Rico, and was responsible for administering the Division's programs dealing with control and eradication of diseases of livestock and poultry in cooperation with the Insular Officials, Animal Inspection and Quarantine, and Meat Inspection activities for the Agricultural Research Service.

Following graduation from veterinary school, Dr. Miller entered federal service with the former Bureau of Animal Industry and his first assignment was in Mexico with the foot-and-mouth disease eradication program where he served for three years. He was transferred to Louisiana for field work on the control and eradication of tuberculosis and brucellosis. He received training under the first Veterinary Administrator Development Program in Arizona, and in October, 1955, he was appointed assistant veterinarian in charge, Raleigh, N. Car. In 1957 he was transferred in the same capacity to Nashville, Tenn., in June, 1959, he was promoted to veterinarian in charge, San Juan, Puerto Rico.

Dr. Miller is a member of the National Association of Federal Veterinarians.

Veterinary Military News

Greek Army Veterinarian Visits U.S.

Captain Dimitrios Mourelatos, a member of the Veterinary Corps of the Greek National Army, is nearing completion of a four-month observer tour of duty in the United States. This tour was concurrent with a formal ten-week course of instruction for Veterinary officers on veterinary preventive medicine and food inspection, which was held at the U.S. Army Meat and Dairy Hygiene School in Chicago. During his observer training, Captain Mourelatos spent three weeks at the Military Subsistence Testing Laboratory observing military testing procedures, and one week at Fort Sheridan studying the organization and duties of an army post veterinarian. Captain Mourelatos also visited the School of Veterinary Medicine at the University of Illinois, Urbana.

Capt. Dimitrios Mourelatos

A native of Salonica, Greece, Captain Mourelatos was graduated from the National Veterinary School of Lyons, France, in 1952. He then entered the Greek National Army as a first lieutenant. Prior to his visit to the United States, Captain Mourelatos was serv-

ing as director of veterinary service of the 15th Infantry Division, Greek National Army, and commander of the 980th Veterinary Detachment.

The Captain and his wife, Mrs. Marianne Mourelatos, attended the annual AVMA Convention in August as guests of the AVMA.

Col. William E. Jennings (COR '31) receives an Army Commendation Medal from Brig. Gen. John A. Seitz, chief of staff, Fifth U.S. Army, and a certificate of achievement on the occasion of his retirement from the Army on Sept. 30, 1961. Col. Jennings joined the Veterinary Corps in July, 1934. He has accepted an appointment with the state of New York in Albany to establish and direct its meat hygiene service. He is a member of the AVMA Council on Education and of the Advisory Board on Veterinary Specialties.

Radioactive Contamination Course Attended by Veterinarians

Contaminated foods and food shortages that may result from a nuclear detonation are two problems studied recently by Army and Air Force veterinary officers at Walter Reed Army Institute of Research, Washington, D. C.

More than 20 officers who attended the Veterinary Aspects of Nuclear Medicine course were trained in the surveillance monitoring of food and water for the presence of radioactive contamination.

Highlights included a discussion of the radiation syndrome by Dr. Sol Michaelson, Department of Radiobiology, University of Rochester, School of Medicine; a presentation by Dr. Edwin P. Laug, Food and Drug Administration, concerning foods exposed to nuclear detonations, and an all-day session devoted to a problem related to the veterinary service in a general atomic war. Presiding over the latter session will be Lt. Cols. George F. Dixon (OSU '43) and Joseph E. Reid (OSU '40), both of the office of the assistant for veterinary services, Army Surgeon General's office.

State Board Examinations

TEXAS—Feb. 3-5, 1962, Texas Hotel, Fort Worth, Texas. Completed application must be received by Board 30 days prior to examination date. Mr. T. D. Weaver, Executive Secretary, 207 Capital National Bank Bldg., Austin 1, Texas.

Deaths

Star indicates member of AVMA

Ray N. Russell (KCV '10), 77, Rogers, Ark., died July 1, 1961.

Dr. Russell practiced in Great Bend, Ark., for 10 to 12 years before moving to Rogers in 1916. He was a government veterinarian until his retirement seven years ago.

Nelson E. Southard (OSU '17), 66, Dania, Fla., died Aug. 14, 1961.

Dr. Southard had practiced since 1920 and since 1927 has been the only veterinarian to have offices at Hialeah Park where he served as track veterinarian. One of his sons, Dr. Francis Southard, is also a veterinarian.

George W. Trubey (MSU '19), 68, Vista, Calif., died of a heart attack July 19, 1961.

Dr. Trubey was for many years a federal veterinarian working out of Detroit, Mich. He retired in 1958.

★**Leonard R. Twete** (OSU '22), 65, Thief River Falls, Minn., died in August, 1961.

Don Wheeler (ISU '53), 35, Washburn, Ill., died July 4, 1961.

Dr. Wheeler maintained a practice in Oswego, Ill., for three and one-half years. He then moved to Washburn where he was employed as a representative for the Corn States Laboratories of Omaha, Neb.

Lloyd D. Whitaker (USC '11), 75, Farmville, Va., died July 6, 1961.

Dr. Whitaker had retired in 1944.

Manton B. Wilkinson, 85, of Saranac, Mich., died July 6, 1961.

Newcomb Williams (CIN '13), 69, College Corner, Ohio, died June 25, 1961.

Dr. Williams had practiced in College Corner for 48 years.

★**Evan J. Wills** (ONT '96), 96, Harrisonburg, Va., died July 12, 1961.

★**Henry B. Wintringham** (SF '14), 77, Lakeport, Calif., died June 20, 1961. He was retired.

Women's Auxiliary

South Dakota Auxiliary Elects Officers

Officers elected at the annual meeting of the Women's Auxiliary to the South Dakota V.M.A., Sept. 13-14, 1961, are: Mrs. Homer Caley, Webster, president; Mrs. Norman Merriweather, Miller, vice-president; and Mrs. Sidney Milburn, Elk Point, secretary-treasurer. Mrs. Caley and Mrs. Merriweather were appointed delegates to the Women's Auxiliary to the AVMA convention in Miami Beach next August.

Officers of the Women's Auxiliary to the South Dakota V.M.A. are (left to right): Mrs. Sidney Milburn, secretary-treasurer; Mrs. Homer Caley, president; and Mrs. Norman Merriweather, vice-president.

Also at the meeting the auxiliary heard a report on the national Auxiliary meeting in Detroit from Mrs. Sidney Milburn and Mrs. D. L. Cotton, delegates to that convention. The South Dakota auxiliary voted to make equal contributions to the AVMA Research Fund and the Auxiliary Student Loan Fund.

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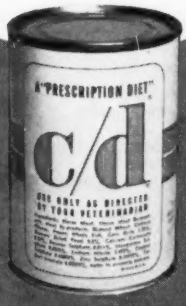

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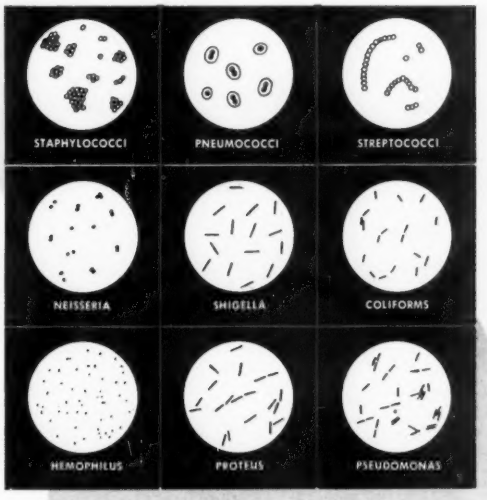
Chart shows Neothion is effective against 9 types of mastitis-causing bacteria, including strains of staphylococci resistant to other antibacterial agents.



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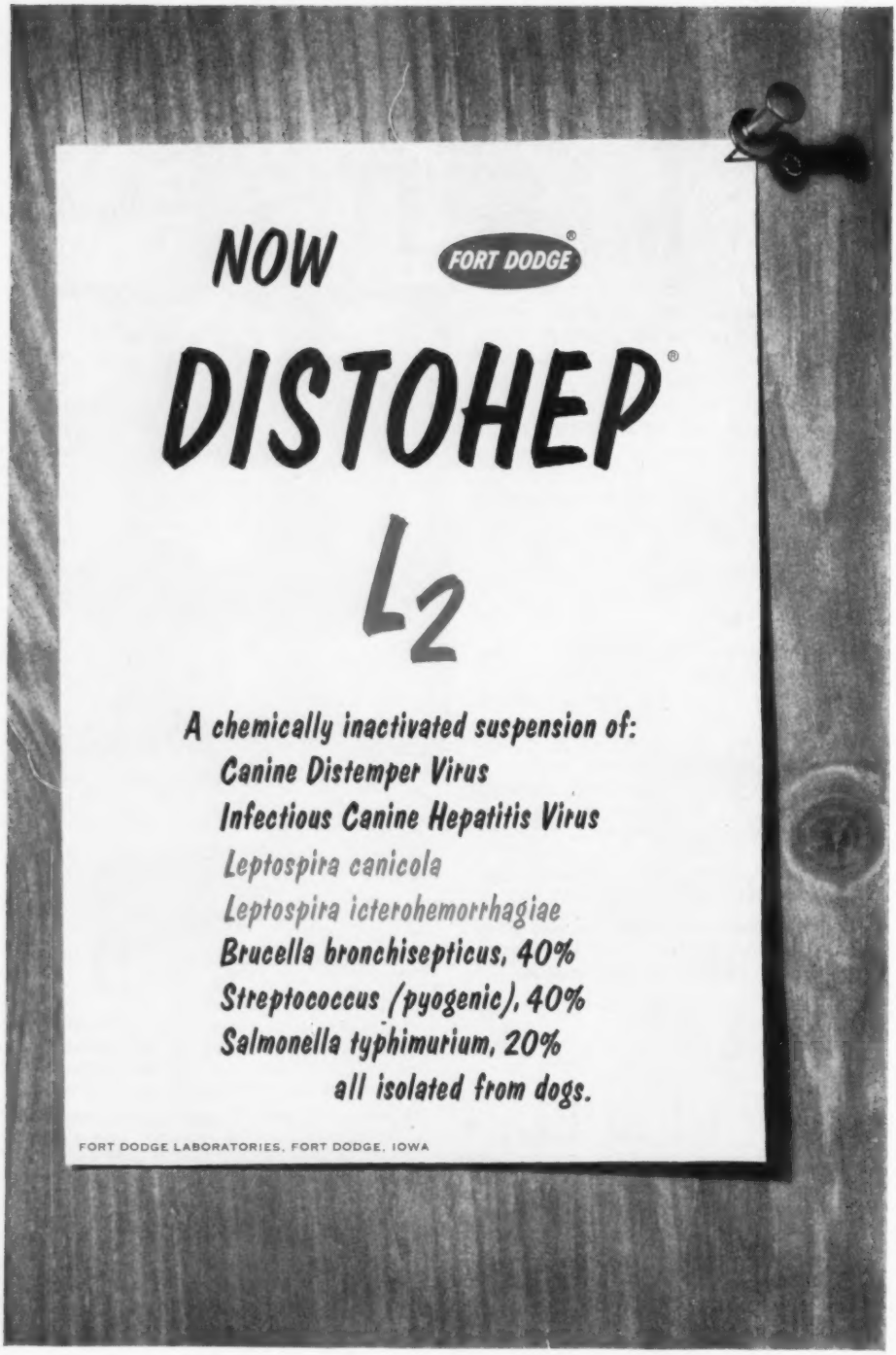
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Salmonella and Other Disease-Producing Organisms in Animal By-Products—A Survey

L. G. Morehouse, D.V.M., Ph.D., and E. E. Wedman, D.V.M., M.P.H.

IT HAS BEEN reported in both domestic and foreign literature that poultry, fish, and livestock by-products* sometimes contain pathogenic microorganisms.[1-15,17-27,30-32,-34-38,40-50,52,54-58] Many reports concern the organisms of the genus *Salmonella*, specifically their presence in animal by-products used in poultry rations.[6,12,14,15,24,30,40,50,57,58]

Indications of the role animal by-products and rations play in *Salmonella* infections of cattle are limited principally to reports from foreign countries.[19,32,39,43] A similar situation exists in the case of swine.[35,45,53] However, these reports are of interest in view of an increasing number of by-products from which the *Salmonella spp.* have been isolated in this country. Reports of isolations of *Salmonella spp.* from dog foods are of interest since animal by-products used in the preparation of dog foods also may be incorporated into poultry, swine, and laboratory animal rations.[18,22,25]

Many reports point out the presence of *Salmonella spp.* in animal by-products, or rations containing them, without emphasizing the significance of their presence in a particular species of animal or to specific disease incidents.[1,4,5,8,11,31,32,38,42,44,46-48,54,55]

A number of workers have expressed opinions on the factors responsible for contamination of by-products that may be incorporated into livestock and poultry rations. It was stated in 1955 that distribution of these potential pathogens by egg-, poultry-, and meat-processing industries appeared highly important.[25] The role of food-processing plants in dissemination of *Salmonella* and the presence of these organisms in the environment of abattoirs has been reported.[7,16,17,25] Other reports further stress the possibility of contamination of animal by-products and equipment from the slaughter of carrier animals,[7,25] from human sources,[13,45] rodents,[6,14,30,34] pigeons, sparrows, wild birds,[6,30] dogs,[13,18,30] and flies.[51] Contaminated feed sacks may be *Salmonella* disseminators.[32,33,37,44,45,52]

It has been emphasized that sterilization during processing is an important step in minimizing the danger of delivery of contaminated animal rations to consumers.[1,18,23,37,56] Several workers[30,32,44,56] have stressed the importance of preventing recontamination which would nullify the effectiveness of sterilization and other hygienic practices.

As a result of increased interest in this

Dr. Morehouse is head pathologist, and Dr. Wedman is chief veterinarian, Diagnostic Services, Animal Disease Eradication Division, National Animal Disease Laboratory, Ames, Iowa.

*For purposes of this paper, the term "animal by-products" will be used to include all three categories.

subject manifested in both scientific and lay publications, resolutions were received by the Agricultural Research Service of the U.S. Department of Agriculture from the North Central States Poultry Disease Conference, the Committee on Salmonellosis and Related Enteric Diseases of the National Plans Conference, and the American Association of Avian Pathologists. These resolutions requested that action be taken immediately by a federal agency to review the problem of pathogenic organisms in animal by-products that are incorporated into rations for poultry and livestock.

Methods

A special committee composed of members of the Animal Disease Eradication Division of the U.S. Department of Agriculture was named to study the spread of *Salmonella* and other disease-causing organisms in poultry and livestock by means of animal by-products. Initially, a review of the literature was prepared to document published material on the subject. Secondly, meetings were held between committee members and interested groups to determine policies and procedures for gathering the desired information. Working through the veterinarians in charge of each state and their respective staff veterinarians, the Animal Disease Eradication Division made 1,100 contacts* throughout the country to accumulate information on the occurrence of pathogenic organisms in animal by-products, various routes of their dissemination, their real or potential disease threat to the country's poultry and domestic livestock, and to determine what measures could be taken to eliminate the problem.

Results

Although it was emphasized that this investigation included all pathogens that might be present in animal by-products, the survey revealed that most attention has been focused on *Salmonella* organisms. This substantiated the findings of the literature review. Isolations of pathogens other than *Salmonella* from animal by-products were reported from nine states (Table 1).

Organisms of *Salmonella* were reported in 718 different samples of a total of 5,712 from which isolations were attempted. Reports were received from 31 states. The recoveries were made from 14 different animal by-products and from complete rations. Some of the information received concerning attempted and successful isolations of *Salmonella* did not lend itself to tabulation. Other material was held confidential due to work in progress or manuscripts in preparation on this subject. Nevertheless, the data (Table 2) suggests the wide variety of by-products that may become contaminated with *Salmonella spp.* Five products reported in this survey that seemed of particular significance because of the high percentage of the samples that contained *Salmonella* were egg products, poultry by-products, meat scraps, meat scrap and bone meal, and dog food. Although they represented only 28% of the recorded attempted recoveries, they accounted for 71% of the total *Salmonella* isolations reported.

Isolates from 379 of the 718 samples containing *Salmonella* were reported by serotype. The remainder either were not typed or the type was not reported. The typed isolates from the 379 positive samples totaled 465 and represented 51 different serotypes. Among the five products containing the highest percentage of *Salmonella* contaminated samples, the known different serotypes recovered ranged from 17 in dog food to 34 in meat scraps. Frequency with which various serotypes were recovered are summarized (Table 3). *Salmonella montevideo, S. senftenberg, S. typhimurium S. cubana, S. infantis,* and *S. oranienburg* occurred most frequently. Within a given by-product or ration, there was not an overwhelming predominance of any one serotype. In the case of meat scraps, *S. montevideo* and *S. oranienburg* most frequently were recovered; in meat scrap and bone meal, *S. senftenberg* and *S. montevideo* most often were found; and, in poultry by-products and poultry rations, *S. typhimurium* most frequently was reported.

Considering the ubiquitous nature of *Salmonella* organisms and the ability of a wide range of species to act as carriers, ample opportunity may exist for their carry-over into animal by-products during slaughtering and processing. However, when processing includes proper sterilization, this danger is minimized. The general consensus in this investigation was that recontamination of the product probably was the most important single factor accounting for the presence of *Salmonella* organisms in animal by-products and that

*These contacts included laboratories and extension services of colleges and universities, public health and private industry laboratories, regulatory agencies, veterinary practitioner groups, rendering groups, animal by-product processors, feed manufacturing and processing groups, meat packers and allied groups, fur bearing animal raisers, and biological and drug manufacturers.

TABLE 1—Microorganisms Other than *Salmonella* Isolated from Animal By-Products and Feeds

Product	No. of samples cultured	No. of samples positive	Isolate
Poultry feed	4	2	Candida albicans
Bone and fish meal	300	5	Bacillus anthracis
Pork livers	1	1	Mycobacterium tuberculosis var. avian
Horse meat	1	1	Klebsiella sp.
Horse liver	Unknown	Unknown	(Clostridium botulinum (Klebsiella sp.
Packing-house offal	Unknown	Unknown	(Clostridium botulinum (Klebsiella sp.
Complete feeds	30	17	Staphylococcus sp.
Turkey offal	Unknown	Unknown	Erysipelothrix rhusiopathiae
Wool	50	3	Bacillus anthracis
Bone meal	10	2	Bacillus anthracis
Imported goat hair	Unknown	Unknown	Bacillus anthracis
Imported goat hair	8	4	Bacillus anthracis
Poultry by-products	3	3	Newcastle disease virus (mesogenic)

rodents were the most probable source of the recontaminating organisms. Wild birds, dogs, and other animals also were considered as possible sources of recontamination, along with human handlers of the products, and possible contamination from the re-use of feed sacks. It was indicated that careful attention must be given to the separation of the so-called raw meats and the processed products and to areas in which the former are stored and the latter are milled, sacked, and stored.

Definite conclusions on the actual disease loss caused by the presence of *Salmonella* organisms in animal by-products were not reached. Definitive evidence pointing to by-products or rations as sources of causative organisms responsible for field instances of disease was lacking.

Discussion

An increasing number of reports in the scientific literature and the findings of this committee leave little question that a wide variety of animal by-products and rations sometimes are contaminated with organisms of *Salmonella spp.* There was little disagreement among those interviewed on this particular point, although there was considerable variance of opinion as to the significance of their presence. The reasons for this variance of opinion center around six key beliefs: (1) There is a general lack of knowledge concerning the incidence of salmonellosis in our domestic livestock: therefore, it is difficult to judge the significance of *Salmonella* in animal by-products incorporated into rations. (2) Conclusive evidence is lacking that *Salmonella* serotypes responsible for specific disease incidents are introduced to livestock or poultry by their rations. (3) The significance of the wide variety of *Salmonella* serotypes found in animal by-products deserves further study. (4) Attention should be given to the numbers of organisms found in the by-product samplings in arriving at the significance of their presence. (5) A lack of standard methods for recovery of these organisms from animal by-products makes it difficult to evaluate reports received from different laboratories. (6) More work is needed to establish the pathogenicity of the various serotypes before valid conclusions can be reached concerning the significance of contamination of by-products with *Salmonella* organisms.

TABLE 2—Recovery of *Salmonella* from Animal By-Products and Complete Rations*

By-product	Samples cultured for Salmonella	Samples containing Salmonella	No. of states reporting
Animal by-product(s)**	1,090	0	3
Blood meal	17	0	3
Bone meal	46	3	6
Calf milk replacer	33	3	4
Complete feeds	1,415	71	15
Dog food	143	27	5
Dried buttermilk and whey	6	0	2
Egg products†	142	75	4
Fat	5	1	2
Feather meal	524	35	9
Fish meal	164	18	10
Laboratory animal feeds‡	Unknown	158	1
Livers	26	1	2
Meat scraps	874	276	18
Meat scraps and bone meal	326	86	9
Meat meal	6	1	1
Poultry by-products	141	47	10
Poultry feeds	403	20	10
Products (miscellaneous animal protein)	51	7	1
Swine supplements	4	2	2
Tankage	316	46	8
Total	5,712	718	31

*A breakdown on the number and types of Salmonella recovered from each by-product and ration is available on request. **Information as to the type of animal by-product was not available. †Egg concentrate, frozen whites, dried whole eggs, frozen yolk, dried yolk. ‡Neither attempted isolations nor successful isolations are shown in the total at the end of the table since number of attempted recoveries was not known.

It is not the intent of the committee to confirm or deny these various points of view. However, it must reflect its own evaluation in the light of information developed from this study. The general lack of evidence to suggest that specific disease incidents are occurring as a result of the presence of certain *Salmonella* serotypes in animal by-products leads this study group to believe there is no cause for alarm concerning this problem. However, there are many causes for concern. The literature documents instances where *Salmonella* infections in poultry, domestic livestock, and laboratory animals were either traced to or associated with the rations.[6,15,19,22,30,35,39,50,57] Possible interference with testing programs due to *Salmonella* in poultry rations has been suggested.[24]

Although it is true that conclusions could not be reached about actual disease losses due to these organisms in animal by-products, the significance of their presence merits further consideration. Significance may depend upon whether proved disease incidents and losses from *Salmonella spp.* traced to animal by-products are to be used as the only criterion or whether the link that animal by-products may form in the cycle of these organisms from the farms to the processing plants and back to the farms in rations is to be considered. There seems to exist at least a potential disease problem concerning the possible "seeding" of poultry and livestock with a variety of *Salmonella* serotypes by contaminated animal by-products.

Since paratyphoid infections are among the most important bacterial diseases of the hatching industry and may result in high death losses among all types of young poultry, the concern of the poultry industry regarding presence of a wide variety of *Salmonella* serotypes in animal by-products seems justified. Serotypes *S. montevideo*, *S. typhimurium*, and *S. oranienburg*, which are known to be capable of producing high mortality in poultry, were among the paratyphoids most frequently reported from animal by-products. The pathogenic propensities of many *Salmonella* serotypes are unpredictable. Their lack of host specificity has been emphasized.[29] In given areas, salmonellosis may be caused by serotypes previously not associated with disease.[13,32] It seems questionable, therefore, that the presence of any *Salmonella* serotype in animal by-products should be considered insignificant.

Although numbers of organisms that are

TABLE 3—Frequency of Occurrence of *Salmonella* Serotypes Recovered from Animal By-Products and Rations

Salmonella serotype	No. of times reported	Salmonella serotype	No. of times reported
alachua	3	minneapolis	1
anatum	18	minnesota	13
bareilly	9	mishmar-haemek	1
binza	10	montevideo	38
blockley	2	muenchen	3
braenderup	1	newington	2
bredeney	15	newport	4
california	6	norwich	1
canoga	1	ohio	3
cerro	12	oranienburg	23
champaign	3	orion	1
cholerae-suis	6	panama	2
cholerae-suis var. kuzendorf	2	paratyphi B	3
cubana	24	pullorum	1
derby	14	reading	1
enteritidis	4	rubislaw	1
gallinarum	1	san-diego	1
gaminara	2	schwarzengrund	12
give	1	senftenberg	34
illinois	16	senftenberg [diphasic]	5
indiana	2	siegburg	7
infantis	23	simsbury	2
java	1	taksony	2
johannesburg	6	tennessee	12
kentucky	18	thomasville	5
lexington	18	thompson	10
livingston	5	typhimurium	26
madelia	6	typhimurium var. copenhagen	1
manhattan	1	urbana	1
manila	2	westhampton	1
meleagridis	7	worthington	14

present in these by-products or rations are undoubtedly of importance in determining a disease producing potential, it has been reported that disease may be established in chicks with as few as 1 to 10 paratyphoid organisms.[28] It seems logical to believe that small numbers of *Salmonella* organisms may be capable of establishing at least a carrier state in nature regardless of the source of exposure; this might manifest itself in overt disease at a later period, depending upon such conditions as host susceptibility and stress factors.

Standard procedures for isolating *Salmonella* from animal by-products would be highly desirable in order to facilitate evaluation of reports from various laboratories. Such procedures might be developed through a cooperative effort of representatives from laboratories in private industry, the Conference of Veterinary Laboratory Diagnosticians, American Association of Avian Pathologists, and the American Association of Veterinary Bacteriologists.

Further study is needed to determine the pathogenicity of the various paratyphoid serotypes in poultry and other species, the ability of these organisms to establish themselves in a carrier state, and the part that stress factors play in inducing clinical responses in "healthy" carriers.

Even in the absence of further studies, but considering the information already in the literature and that gathered by this study, it was the conclusion of this committee that realistic, workable measures to minimize the chance for exposure of livestock and poultry to the *Salmonella* species or other pathogens that may be present in animal by-products should be undertaken. Many processors of these products are endeavoring to assure a product free of these organisms when it leaves their plants.

As an immediate general corrective procedure, this study group recommends development and adoption of a sanitary health code by animal and poultry by-products processors and allied utilization industries to assure industry practices designed to offer a product free from pathogens and to prevent recontamination. In addition, an educational program on means of original contamination and prevention of recontamination of these products should be directed to animal and poultry by-products processors, allied utilization industries, and to the ultimate purchaser.

Long range studies pertinent to the problem would include development of uniform methods for isolation of *Salmonella* from animal by-products, further studies on the pathogenicity of various *Salmonella* serotypes, and studies on the ability of these organisms to induce disease or carrier states when introduced in the rations.

Summary and Conclusions

A survey was undertaken by the Animal Disease Eradication Division of the U.S. Department of Agriculture to accumulate information on the occurrence of pathogenic organisms in animal by-products, to evaluate their real or potential disease threat to the nation's poultry and domestic livestock, and to recommend corrective measures where necessary. Most important findings disclosed by the survey were:

1) Primary attention has been focused on *Salmonella*. Isolation of a limited number of other pathogens from animal by-products has been reported, but their disease significance has not been determined.

2) There were 59 *Salmonella* serotypes isolated from a wide variety of animal by-products. According to reports tabulated from 31 states, isolation attempts were made from 5,712 samples, and 718 contained *Salmonella*.

3) Serotypes most frequently recovered included *S. montevideo, S. senftenberg, S. typhimurium, S. cubana, S. infantis,* and *S. oranienburg*.

4) Definitive evidence that animal by-products in rations are sources of causative organisms responsible for specific field occurrences of salmonellosis is lacking. The potential disease threat posed by these organisms in animal by-products is worthy of further analysis.

5) Recontamination of animal by-products after their processing is believed the principal factor accounting for the presence of *Salmonella spp.* in them; possible sources of this contamination are rodents, wild birds, dogs, and human handlers of products.

6) There is need for development and adoption of a sanitary health code by processors of animal by-products and by allied utilization industries to aid them in offering products free from pathogens and to prevent recontamination of these products.

7) A need for development of uniform

methods for isolation of *Salmonella* from animal by-products is apparent.

8) The pathogenicity of various *Salmonella* serotypes and the ability of these organisms to induce disease or carrier states when introduced in poultry or animal rations seems worthy of further study.

9) Industry groups involved in this problem are conducting an active research program designed to investigate procedures and environmental problems associated with possible contamination of some products; they are willing to place into effect whatever measures are necessary as such methods are proved effective.

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Canadian Hog Cholera Epizootic Ends

With the destruction of 56,969 exposed and infected hogs and compensation totaling $1,507,000, Canada once again considers itself virtually hog cholera free. Compensation to farmers during the eight months in which the epizootic was in existence was greater than the entire cost of compensation for the hog cholera program since 1904.

Scraps from fresh pork imports from the United States fed to hogs without being properly cooked and lax enforcement of regulations pertaining to movement of hogs in Canada were blamed for rapid dispersion of the disease.—*National Hog Farmer, 6, (Sept., 1961): 28.*

Chlordiazepoxide for Calming Zoo Animals

Werner P. Heuschele, D.V.M.

ATARACTIC DRUGS are employed widely in the management of tame animals, but there does not yet exist any considerable fund of experience in their use with zoo animals, which are in much greater need of calming and "chemical restraint." This need is acute during special stress: the traumatic experience of being shipped to the zoo and inducted into cage life and the occasions when grooming and medical and surgical procedures involve forcible and often painful handling by man. However, the zoo veterinarian must proceed with caution in chemotherapy; he is dealing with rare and valuable animals, each with its particular physiology and reactive patterns. He cannot afford to exceed the limits of proved safety.

A certain amount of guidance in the use of the new tranquilizing agents is gained from those[4,5] who have worked out dose levels for domesticated animals and recorded possible dangers. It has been learned, for instance, that dogs have a species sensitivity to reserpine, which also must be used with caution in treating horses and bulls. The dangers to man as well as animals from use of phenothiazine-derived tranquilizers are well known. I found promazine effective and nontoxic in a small number of animals in the San Diego Zoo.[1] However, a Public Health Service team in Alabama,[8] which used perphenazine in 10 chimpanzees, reported that one developed a type of Parkinsonian syndrome.

Aside from considerations for safety, the zoo veterinarian has long needed an agent to control apprehension, a predominant trait in captive wild animals. When chlordiazepoxide* was reported as having a specific effect on anxiety,[6,7] it was investigated. Pharmacologic experiments were of particular significance,[2] notably comparative studies of the effects of meprobamate, chlorpromazine, and chlordiazepoxide in monkeys. Unlike the first two, chlordiazepoxide had a taming and quieting effect at dose levels far below those which depressed activity. It tranquilized monkeys at 0.1 the ataxic dose, whereas meprobamate, chlorpromazine, and also phenobarbital did not control the hostility of the monkeys until they were virtually immobilized by the drug. In further experiments with mice, rats, dogs, cats, and monkeys, the muscle relaxant and sedative effects of chlordiazepoxide were demonstrated.[3] It depressed the avoidance response and spontaneous locomotor activity and calmed rats made vicious by lesions in the septal area of the brain.

Present Study

A study of chlordiazepoxide was initiated at the San Diego Zoo. Here reported are the effects in 22 animals belonging to 18 genera. The dose used initially was determined by trial and error on a schedule roughly proportionate to body weight. Medication was usually given orally. After the animal had been fasted 12 to 24 hours, the drug was mixed with an acceptable food. Often considerable patience was required to outwit the subject, and the exact amount of the drug consumed could not always be determined.

In larger or more aggressive animals, or both, the drug was administered by intravenous or intramuscular routes. Polysorbate 80 was the diluent in these cases. Two extremely timorous fallow deer (*Dama dama*) were immobilized before intravenous injection of chlordiazepoxide by using succinylcholine chloride in a projectile syringe. This myoneural blocking agent for relaxing skeletal muscles acts only briefly, since it is rapidly hydrolyzed by nonspecific cholinesterase into nontoxic choline and succinic acid.

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*Librium, Hoffmann-LaRoche Inc., Nutley, N.J.

Effects of Chlordiazepoxide in 22 Animals

Among the most striking effects of chlordiazepoxide administration was the transformation of a male European lynx (*Lynx lynx*) and male and female dingoes (*Canis familiaris dingo*) from hostile, aggressive beasts into friendly animals. Before medication, the lynx was vicious, charging the cage front when approached with its teeth bared, snarling and striking with its claws. He was given, orally, 6 mg. of the drug per kilogram of body weight and, two to three hours later, was perfectly calm when the observer entered his cage and roused him from sleep. He licked the observer's finger and allowed him to pet and examine his paws, but growled when an attempt was made to pick him up bodily. When left alone, he settled down to sleep again. The drowsiness and a slight ataxia persisted for several hours. The female dingo was normally very hostile when its cage was approached, ready to attack with its teeth bared and the fur on its back erected. After an oral dose of chlordiazpoxide (3 mg./kg.), with onset of action in about two hours, she became friendly. When the observer approached, she came to the front of the cage, wagging her tail, and licked his hand. She was rather apprehensive when he entered the cage, but calmed down and allowed him to pet her. At this dose level, there was no ataxia; in a later trial with 7 mg./kg. orally, she had some ataxia, was somewhat apprehensive, but not actively aggressive. The male dingo, which normally cowered in the corner of his cage instead of becoming hostile, reacted much like the female when given the same doses.

Several animals in need of therapy became tractable when given premedication with chlordiazepoxide. A female Guinea baboon (*Papio papio*) was given 13 mg./kg. orally; two and a half hours later, she was docile and allowed intravenous administration of pentobarbital sodium—2 gr. instead of the 5 gr. which would have been necessary without this medication.

A male California sea lion (*Zalophus californianus*) suffering from keratitis had resisted topical therapy, barking and charging the veterinarian. Four hours after an oral dose of chlordiazepoxide, 7 mg./kg., the huge animal was lethargic and could be treated by the operator standing only a foot away.

A vicious male Burmese macaque (*Macaca nemestrina andamensis*) was given 5 mg./kg. intramuscularly in preparation for anesthesia; he reacted calmly as had the baboon. An extremely shy and nervous female red kangaroo (*Macropus rufus*), suffering from pneumonia, became perfectly calm one and a half hours after an oral dose of 11 mg./kg. and offered no resistance to radiographic examination. Intravenous administration of chlordiazepoxide, 2.2 mg./kg., in the jugular vein acted within a few minutes to quiet a struggling female mule deer (*Odocoileus hemionus*) so that she could be given an enema and mineral oil for the treatment of constipation.

Several animals, newly arrived at the zoo and near panic, were included in the trials with the new drug. In our experience, many species when placed in an unfamiliar exhibit area will dash about so frantically that they injure or kill themselves by running into a fence or the sides of a cage.

While still in their shipping cases, a male white bearded gnu (*Connochaetes taurinus*) and a fragile, terrified female gerenuk (*Litocranius walleri*) were given intramuscular injections of chlordiazepoxide in doses of 4 and 5 mg./kg., respectively. Within 45 minutes, these animals were released and walked calmly and without fear into their new enclosures. The effects of the medication persisted about 4 hours, by which time the dangerous crisis of induction was safely over.

Three golden marmosets (*Leontocebus rosalia*), given oral doses of 15 mg./kg., had been in panic, running frantically around their cage, but could be picked up and stroked 3 hours after medication.

Animals which did not respond to the drug were a male klipspringer (*Oreotragus oreotragus saltatrixoides*), a female South American tapir (*Tapirus terrestris*), and a Hensel's cat (*Felis pardinoides*), although the latter 2 were given intramuscular doses of 8 and 13 mg./kg., respectively. In an extremely hostile female Sumatran tiger (*Panthera tigris sumatrae*), there was no response to 2 mg./kg. orally.

Two fallow deer, a proboscis monkey (*Nasalis larvatus*), and 2 Sardinian asses (*Equus asinus*) were among the other species treated with success.

Comment and Conclusions

We still do not know why certain species respond to tranquilizing drugs and others

do not. The female Sumatran tiger, the Hensel's cat, the tapir, and the klipspringer represent the four negative responses out of 22 subjects. It is possible that these animals might have reacted well to a booster injection of the same dose of chlordiazepoxide given an hour after initial medication.

There is a great difference in the response of various species to their environment and to man. Some species adjust readily and become somewhat relaxed in the presence of man, others remain highly timid and will become terrified when man intrudes into the security of their captive environment. Perhaps one might theorize that this fear is associated with chemical changes in the nervous system which block the action of the tranquilizer.

On the basis of this preliminary data, it appears that chlordiazepoxide is a safe and effective tranquilizer.

Summary

Chlordiazepoxide produced satisfactory calming of 18 out of 22 aggressive or frightened zoo animals. No evidence of toxicity was observed at dose levels used.

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Equine Nutritional Facts

Few specific nutrient requirements of horses have been established through controlled research. Using information available from other species with due regard for anatomic and physiologic differences, however, horses can be fed well-balanced rations composed primarily of naturally occurring feedstuffs. Such feeding programs may have to be supplemented with minerals and vitamins. Until more controlled experimental work is conducted and quantitative requirements for various nutrients determined, we shall have to rely to a great extent upon practical experience and the correlation of information derived from other species.—*Nutr. News Bull., 17, July, 1961.*

Pre-Exposure Rabies Immunization in Man Using Duck-Embryo Vaccine

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IN SPITE of the millions of dollars that have been spent on the study and control of rabies, this disease continues to be a major world problem. The knowledge that it is invariably fatal once it develops makes it one of the most notorious and feared diseases of man.

The 6,000 to 10,000 cases of rabies in animals reported each year probably represent less than one third of the actual cases, many of which occur in wild animals. Mass vaccination of pets, elimination of strays, and postexposure treatment of 50,000 people per year in the United States has not succeeded in preventing 10 to 20 annual human fatalities.[13] Rabies is the only disease of man in which active immunization after exposure is employed as the recommended treatment. It should be emphasized, of course, that in any infectious disease, it is better to have some degree of immunity to exposure.

An urgent need exists for a simple, safe, prophylactic program for those whose occupations place them at high risk of exposure to rabies. It has been reported that from 28% to 40% of those severely bitten by rabid animals succumb to rabies, whether or not postexposure anti-rabies treatment has been administered.[2,12,27] Within the last few years, two scientists whose work involved visiting caves frequented by bats died of rabies, neither having any knowledge of definite exposure.[14,23] Subsequently, another developed severe anaphylactic shock from the administration of anti-rabies horse serum after a laboratory accident.[3] In 1959, a woman died in California after being bitten by a rabid bat in spite of the World Health Organization's recommended treatment of 1 injection of serum and 14 doses of vaccine; this was initiated within four days of the exposure.[17] Each year, many practicing veterinarians are given Pasteur treatment as a result of possible exposure. The use of chicken embryo-origin anti-rabies vaccine (CEO), reduces the probability of postvaccinal reactions. These reactions have amounted to as many as 1 in 600 of the cases treated, with an estimated fatality of 10 to 25% of those in whom the reaction was severe.[4,7,12,29] The relative efficiency of the CEO vaccines has been reported previously.[28] Comparative studies of CEO Flury vaccine and the older nerve-tissue vaccines have been reported.[6,7]

In another attempt to solve this problem, it was decided that certain military personnel in this area would be immunized; included were veterinarians, dog handlers, and laboratory technicians involved in rabies diagnostic procedures. Duck-embryo vaccine was chosen because: (1) it produced rapid antibody response[20,10]; (2) it had prepared recipients for a good response to booster inoculations and had elicited the recall phenomenon in those who had previously been immunized with other vaccines[7,10]; (3) it was free from neuroparalytic factors[5]; and (4) it had passed the National Institutes of Health potency test and

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was licensed for general use.[5,19] For comparative purposes, the subcutaneous (1.0 ml.) and intradermal (0.1 ml.) routes of inoculation were selected.

Materials and Methods

Vaccine.—Vaccine for the test* was reconstituted for use as directed on the package. This vaccine, prepared by the Powell-Culbertson method,[22] is a suspension of embryonic duck tissue infected with fixed rabies virus employing *beta*-propiolactone as a virucidal agent.

Human Volunteers.—Thirty-two human volunteers were allotted to 6 groups for the purpose of this study of their serologic responses. Group 1 consisted of 8 individuals who had not previously been given rabies vaccine and who were given three 1.0-ml. doses of the vaccine subcutaneously (s.c.) at weekly intervals. Group 2 consisted of two veterinarians with a history of previous anti-rabies treatment who were given a single 1.0-ml. booster dose, s.c. Two persons given 14 daily 1.0-ml. doses, s.c., of duck embryo vaccine were included for control purposes, and were placed in group 3. Group 4 consisted of 12 persons without previous rabies immunization history who were given three 0.1-ml. intradermal (i.d.) doses at one-week intervals and, five months later, were given a 0.5-ml. booster dose, s.c. Group 5 consisted of five previously unimmunized individuals given only three 0.1-ml., i.d. doses with no booster. Each of the three veterinarians in group 6, who had had full-course anti-rabies treatment previously, were given a single 0.1-ml., i.d. booster in this study.

Serum.—Serum specimens were collected prior to and three weeks and five months after initiation of immunization and, in the case of group 4, six months after initial immunization. The serum specimens were stored at −30 C. prior to testing.

Virus.—Decimal dilutions of rabies standard challenge virus (CVS) were employed against undiluted inactivated serum for neutralization tests conducted according to the method recommended by the Commission on Viral Infections, Armed Forces Epidemiological Board,[18] with the exception that the second hour of incubation was conducted at 4 C. The difference between the endpoint titers of the virus in the presence of the pre- and postimmunization serum samples is reported as the log-neutralization index. In cases in which previous anti-rabies therapy had been reported, the titer of the virus in the presence of known negative control serum was employed as the base line for calculations. A log-neutralization index of 1.7 or greater was considered positive (of diagnostic significance), one of 1.0 through 1.6, equivocal (of questionable significance), and of less than 1.0, negative (of no significance). Albino Swiss mice weighing 8 to 10 Gm. were used as test animals.

*Supplied by Eli Lilly Company, Indianapolis, Ind.

Results

Of the eight persons in group 1 (Table 1) given three 1.0-ml. doses of vaccine subcutaneously at weekly intervals, five had positive neutralization indexes three weeks after the first immunization, two had negative neutralization indexes, and one was not available for collection of a blood sample. Five months after first immunization, two of the eight subjects remained positive, one was equivocal, three were negative, and two had been discharged from the service and were not available for testing.

One negative subject in group 1 (patient 1) was given 5 daily 1.0-ml. doses, s.c., and three weeks after this booster series, had a log-neutralization index of 3.1.

To determine the effect of a single 0.5-ml., s.c. booster on persons of group 1 with a negative neutralization index, five months after the primary immunization, two persons (patients 7 and 8) were given boosters. When tested a month later, both had positive neutralization indexes (1.8 and 1.7, respectively).

Both veterinarians in group 2 were given two 14-dose courses of Pasteur treatment with nerve-tissue vaccine previously (patient 9 twice in 1941, and patient 10 once each in 1936 and 1937.) Each had an increase in antibody titer as the result of the single 1.0-ml., s.c. booster of duck-embryo vaccine.

The two persons in Group 3 had positive log-neutralization indexes (2.1 and 3.4) as a result of 14 daily, s.c. doses, when tested three weeks after initiation of prophylaxis. These persons were incorporated into the study as an index of normal response to orthodox treatment.

Of the 17 persons in groups 4 and 5 (Table 2) given three 0.1-ml., i.d. doses at weekly intervals, nine had positive neutralization indexes at three weeks, four were equivocal, three were negative, and one was not available for testing. Five months after immunization, four persons were positive, one equivocal, ten negative, and two were not available for testing.

The 12 patients in group 4 (Table 2) were given a 0.5-ml., s.c. duck-embryo vaccine booster dose five months after the initiation of original immunization, and blood samples were collected three weeks after the booster was given. Of this group, nine (75%) were positive, one was equivocal, and two were negative.

TABLE 1—Virus-Neutralizing Antibody Response of Human Volunteers to Subcutaneous Inoculation with Duck-Embryo Rabies Vaccine

Group	History, Dose, and Route of Inoculation	Patient	Antibody Titers (Expressed as Log Neutralization Index) After First Duck Embryo Inoculation		
			Base Line	3 weeks	5 months
I	No Previous Vaccine 1 ml x 3 SC at 7-day intervals	1	0.0	0.1	0.3
		2	0.0	3.8	2.4
		3	0.0	3.4	2.5
		4	0.0	3.5	...
		5	0.0	2.3	1.5
		6	0.0	0.8	...
		7	0.0	...	0.8
		8	0.0	2.4	0.7
II	Pasteur Treatment Previously 1 ml x 1 SC	9	3.2	4.8	4.5
		10	2.3	...	3.2
III	No Previous Vaccine 1 ml x 14 SC at 1-day intervals	11	0.0	2.1	...
		12	0.0	3.4	...
Controls	Previous Pasteur Treatment	Positive Human Serum	...	5.0	...
	No Immunization	Negative Human Serum	0.0	...	...

... Test not performed

TABLE 2—Virus-Neutralizing Antibody Response of Human Volunteers to Intradermal Inoculation with Duck-Embryo Rabies Vaccine

Group	History, Dose, and Route of Inoculation	Patient	Antibody Titers (Expressed as Log Neutralization Index) After First Duck Embryo Inoculation			
			Base Line	3 weeks	5 months	6 months*
IV	No Previous Vaccine 0.1 ml ID x 3 at 7-day intervals plus 0.5 ml SC Booster 5 months later	13	0.0	2.2	0.9	2.4
		14	0.0	0.4	0.5	1.0
		15	0.0	1.5	0.0	2.3
		16	0.0	1.0	0.3	0.8
		17	0.0	0.1	0.1	2.1
		18	0.0	2.3	2.3	2.5
		19	0.0	2.4	2.0	3.4
		20	0.0	2.5	0.7	2.2
		21	0.0	1.9	0.0	2.7
		22	0.0	2.5	2.2	2.8
		23	0.0	2.3	1.3	0.9
		24	0.0	3.2	2.6	3.4
V	No Previous Vaccine 0.1 ml ID x 3 at 7-day intervals plus	25	0.0	...	0.9	
		26	0.0	0.1	...	
		27	0.0	1.8	...	
		28	0.0	1.4	0.6	
		29	0.0	1.2	0.4	
VI	Pasteur Treatment Previously 0.1 ml ID x 1	30	0.4	2.3	1.4	
		31	3.5	5.0	...	
		32	3.4	...	3.8	

*One month after 0.5 ml SC booster

... Test not performed

TABLE 3—Consolidated Neutralization Test Results on Volunteers Given Duck-Embryo Rabies Vaccine

Route & Dose	Rabies Vaccination History	Number Subjects Tested	Days After 1st Immunization	Results		
				Positive	Equivocal	Negative
SC 1.0 x 3	None	8	0	0 (0%)	0	8
		7	21	5 (71%)	0	2
		6	150	2 (33%)	1	3
ID 0.1 x 3	None	17	0	0 (0%)	0	17
		16	21	9 (56%)	4	3
		15	150	4 (27%)	1	10
+ booster		12	180	9 (75%)	1	2
SC 1.0 x 14	None	2	0	0 (0%)	0	2
		2	21	2 (100%)	0	0
SC 1.0 x 1 or ID 0.1 x 1	One or more series	5	0	4 (80%)	0	1
		3	21	3 (100%)	0	0
		4	150	3 (75%)	1	0

The three veterinarians in group 6 who were given 0.1-ml., i.d., as a single dose had histories of previous rabies immunization. Patient 30 had had a full, 14-dose course of Semple vaccine in 1939, but his prebooster specimen 20 years later had a negative neutralization index. Two and three weeks after the single immunization, however, his neutralization index was positive; but, after five months, the titer returned to the equivocal range. Patient 31, given Pasteur treatment ten years previously, and patient 32, given two courses of Semple vaccine (in 1934 and 1939), had high titer neutralizing antibodies in their prebooster specimens. The titers of both were further increased as the result of a single 0.1-ml., i.d. booster.

Discussion

All of the preimmunization specimens in the small group in our study were negative for rabies antibodies. This is comparable to results generally reported, with a few unexplained exceptions,[10] by others working in this field.[25]

No severe reactions to the vaccine were experienced by any of the volunteers. The majority reported mild local discomfort which disappeared within 72 hours.

More than 50% of the previously nonimmunized volunteers (Table 3) developed neutralizing antibodies three weeks after the initial immunization of 3 doses of duck-embryo vaccine given at one-week intervals, regardless of the route of inoculation (the observed differences in response of 71% for the s.c. and 56% for i.d. were not statistically significant). Similar results were reported with HEP Flury vaccine. If the results of this pilot study are confirmed in larger groups, this might be of economic significance, inasmuch as only one tenth as much vaccine was used for the intradermal inoculation.

In our study, the two controls, given 14 consecutive daily doses of duck-embryo vaccine, had responses not significantly better than those given only 3 inoculations in 15 days. All other reports have indicated a definite superiority of 14 inoculations over 3.

Of the 12 given boosters five months after 3 i.d. vaccinations at weekly intervals, nine had a rise over the titer of the primary immunization, two had a slight drop (although a significant rise over the prebooster level), and one had a continuing drop in titer, even below that of the prebooster level. In the last instance, there is reason to believe that there was some failure in the administration of the vaccine. One per-

son (patient 17), who had consistently negative titers before and after primary immunization, developed a significant antibody response to the booster. Two had no better than equivocal results regardless of the time of blood sampling.

All of those given duck-embryo vaccine boosters after previous immunization with nerve-tissue vaccines demonstrated significant rises in titer. One of these had no antibodies immediately prior to the booster and, although his titer was good two and three weeks after the booster, it declined within five months to the equivocal range. This is in agreement with the general findings that the level of response to the booster is in direct proportion to the response to the primary immunization.[7,10-24,26] High-titer antibodies persisted in some for from 18 to 22 years. Ability to respond has been demonstrated in several instances for as long as 40 years.[6,7]

A number of our subjects might be considered "poor responders." These are indicated in the tables, and some have been discussed above. It has been suggested that some sort of screening method should be employed to identify these people, especially in the case of exposure following previous administration of vaccine.[26] The mouse-neutralization test is impractical for this purpose because a minimum of two weeks is required for its completion. A qualitative method has been utilized in our laboratory which requires less than four hours; it is based on fluorescent-antibody techniques.[8,9] Modifications of this method are being compared with the mouse-neutralization test for the quantitative assay of serum samples from immunized persons; details will be published later.

Because planned challenge is impossible, the real significance of the neutralizing antibody titer in relation to actual protection against rabies is still debatable. However, field experiences in Iran are significant.[2,11] Because of species variation in susceptibility to rabies, results in animals cannot be reliably extrapolated to man.[6,7-11,13] Nevertheless, certain observations can be made: (1) in cattle, protection has been found to be proportional to the antibody titer[1]; (2) in dogs, the same has been true, but some have survived without detectable antibodies[15,16]; (3) to date, there has been no report of a fatality in a person who has been given a full course of anti-rabies vaccine and subsequently exposed to rabies.[21] It seems reasonable to assume that higher titers would correlate well with better protection in man.

Summary and Conclusions

Extensive and thorough tests by the World Health Organization, under the direction of its Expert Committee on Rabies, have shown that its recommended regimen of 1 dose of antiserum followed by 14 of rabies vaccine is the best postexposure treatment for those severely exposed to bites of rabid animals. However, a need exists for a simple, safe, prophylactic program for those whose occupations place them at a high risk of exposure to rabies. Duck embryo-origin vaccine can be successfully used in man to stimulate production of antibodies against this disease prior to exposure thereto, with a minimal danger of postvaccinal complications. Since the serologic response to the smaller intradermal dose compared favorably with that following the larger subcutaneous dose in this pilot study, there seems to be an economic advantage to the use of the former. The antibody response to a single booster in a previously immunized individual is generally equal to or greater than that engendered by the primary immunization. Since the ability to respond to booster immunization has been shown to persist for at least 20 years, a safe and practical method for the prevention of rabies in man now seems possible.

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Dental Caries in Dogs

Dental caries is fairly rare in the dog but occurs more often in dolichocephalic than in brachycephalic breeds. The comparative freedom in the latter presumably is due to abnormal occlusion. Since the opposing molar teeth do not occlude properly, there is less tendency in the short-headed breeds for cereal foods to be impacted on these occlusal surfaces.

The predilection sites for caries are the upper molars; the lower molars are seldom affected. Caries does not occur on the lingual, buccal, or approximating surfaces of the teeth.—*J. South African V.M.A., 31, (Dec., 1960)*: 475.

Acute Hemorrhagic Pancreatic Necrosis in a Dog

Allen Wolff, D.V.M.

APPARENTLY, most cases of acute hemorrhagic pancreatic necrosis are diagnosed by pathologists on necrospy.[1,2] The observations reported here may represent a typical case and may help others make an earlier diagnosis.

An obese, spayed, female Schnauzer, three years old, was examined with a vague history of persistent vomiting and mention that she had a garbage-eating vice. The abdomen was tense; other clinical signs were not apparent. A presumptive diagnosis of gastritis was considered, and the dog was hospitalized.

Treatment with tranquilizers and an anticholinergic agent* for two days was ineffective. Gastrointestinal lavage was attempted. A blockage at the region of the pylorus was suspected when it was observed that no enema solution passed into the upperdigestive system and out through the mouth. Radiographs provided no diagnostic assistance. The patient's condition continued to deteriorate, and an exploratory laparotomy was performed.

The gastrointestinal tract was empty, and the stomach could not be exposed through the abdominal incision. On further exploration, adhesions between the stomach, pancreas, and liver were found. There were gross pathologic changes in the pancreas, and the pylorus was encircled and strangled by the mass. Affected portions of the pancreas were excised with the thought that the patient could be maintained with insulin and pancreatic extract upon recovery. Unfortunately, the patient died from surgical shock. A biopsy was taken for histopathologic study, and a diagnosis of acute hemorrhagic pancreatic necrosis was made.** The cause remains unknown.

Upon histologic examination, it was observed that several lobules of the pancreas had undergone caseation necrosis, leaving only cellular debris and nuclear fragments. There were lobules in which the acinar structure of the pancreas still could be recognized, but pyknosis, karyorrhexis, and the deeply eosinophilic cytoplasm were definite indications of nuclear disintegration. The necrotic process had spread to the stroma and peripancreatic mesentery where there were severe hemorrhages, fibrin deposition, nuclear fragments, potassium and calcium soaps, and numerous neutrophils (Fig. 1).

Acute necrotic pancreatitis, an older expression for this disease, is a condition which occurs most commonly in obese animals and is often fatal within a few days.[3] It is characterized by sudden onset and abdominal pain or peripheral circulatory collapse, or both. There is increased tenseness of the abdominal wall, tenderness, disinclination to move, shallow respiration, rapid pulse, and sometimes vomiting. The high body temperature falls below normal as collapse approaches. There is moderate leukocytosis, normal or slow sedimentation rate, and hemoconcentration. Sometimes, signs of pancreatic islet cell dysfunction are present, such as an acetone odor of the breath, glycosuria, and polyuria. Increased blood sugar, urea nitrogen, and creatinine occur terminally. Pathologic findings include necrosis, edema, and cellular infiltration or hemorrhage in the pancreas. The islet cells are destroyed in the general necrotic process, but there is no evidence suggesting that the islets give rise to the necrotic process. Fatty liver changes are invariably present, as well as inflammatory changes in the adjacent lymph nodes. Kidneys are paler and softer than usual, and the tubules are infiltrated with fat.

In this case, there was no history of any clinical signs suggestive of diabetes or of any exocrine deficiency involving the pan-

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Dr. Wolff is a general practitioner in Brunswick, Ohio.

*Diathal, a combination of procaine penicillin, dihydrostreptomycin, and diphemanil methylsulfate, Schering Corporation, Bloomfield, N.J.

**A. W. Koestner, M.D., Surgical Pathology Laboratory, Ohio State University, Columbus, June 14, 1960.

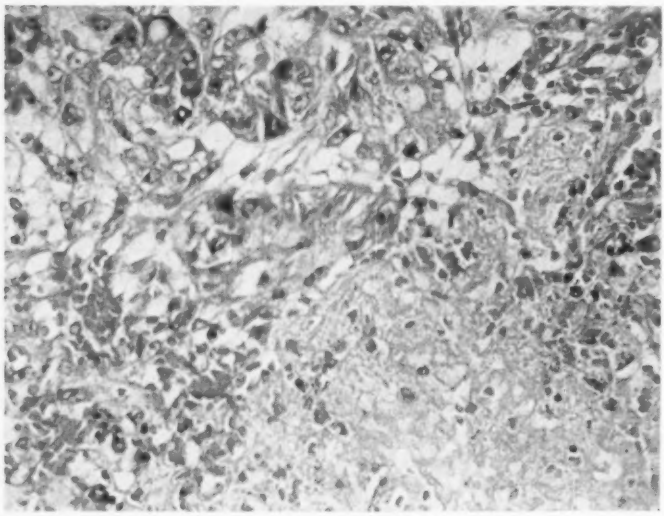

Fig. 1—Section of pancreas with acute hemorrhagic pancreatic necrosis. x 300.

creas.[4] Blood sugar and serum amylase determinations and urinalysis might have been helpful in differentiating this condition from acute intestinal obstruction, infectious canine hepatitis, acute nephritis, peritonitis, and other conditions, although serum amylase is apparently not a reliable diagnostic criterion in the dog.†

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Encephalopathy with Cat-Scratch Disease

Even though most go unreported, thousands of cases of cat-scratch disease probably have been observed by physicians. Encephalopathy, however, is a rare and serious complication. From 276 reported cases, encephalopathy was involved in 20. In one case the patient, a 6-year-old boy, required nine days of hospitalization and was a bed patient at home for another week. Principal features of cat-scratch encephalopathy are coma, convulsions, fever, and muscular weakness.—*Bull. Tulane Univ. Med. Faculty, 20, (Feb., 1961)*: 83.

Specialized Surgery of the Canine Bladder and Prostate Gland

Isolation and Collection of Prostatic Fluid

Marcus M. Mason, D.V.M.; Fred Keefe, B.V.Sc.; Thomas Boria, D.V.M.

SPECIALIZED surgery of the bladder and prostate gland refers to those operative procedures devised for efficient collection of pure prostatic fluid from the dog.

A complete review of surgical attempts to isolate prostatic fluid which covers the period from 1863 to 1947 has been published.[1] These trials and those of our predecessors have been designed to investigate the normal function of the prostate gland in order to gain an understanding of the normal gland in both dog and man. Since the prostate gland is so intimately connected with many other portions of the urogenital system, a number of methods have been tried to isolate the gland so that its secretions could be studied independently. The dog proved to be the preferred experimental species because it has no functional seminal vesicles. The secretions of fluid from the seminal vesicles in other animals constantly introduces a variable factor in the analysis of seminal or prostatic fluid, or both.

The discovery that stilbestrol has metaplastic properties and that it greatly influences the structure and secretions of the prostate gland was a tremendous incentive to research on the prostate gland. From 1939 to the present, a number of techniques have been developed to isolate the prostate gland so that its secretions could be studied while it was under the influence of various hormones and potential antihormones[1,2] (Fig. 1).

We, therefore, present the various surgical procedures used in the past and compare these with our own modifications so that objective evaluations can be made.

From the Biologics Testing Laboratory and the Witt Memorial Hospital for Animals, Worcester, Mass.

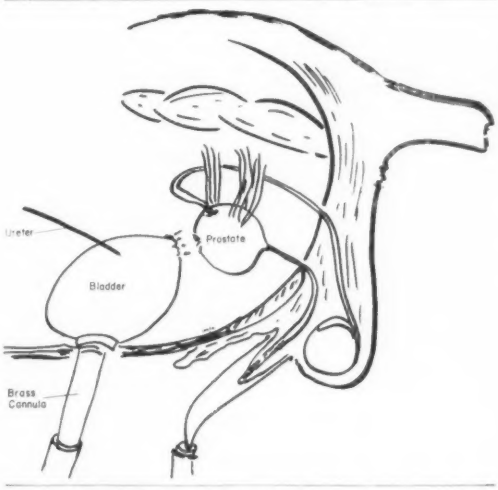

Fig. 1—Original Huggins method of urinary diversion and prostatic fluid collection.

Methods and Surgical Techniques

There are two principles used in isolating and collecting prostatic fluid. The first consists of diverting the urine so that it leaves the bladder before passing through the prostate. Under the title of bladder separation, there are three types of surgery: (1) direct cystostomy, (2) cystoileostomy, and (3) cystopreputiostomy. The second procedure is that of prostatic isolation, and the various methods of accomplishing this are described under the label of prostatostomy.

Cystostomy

One of the simplest methods of urinary diversion is by direct cystostomy (Fig. 2).

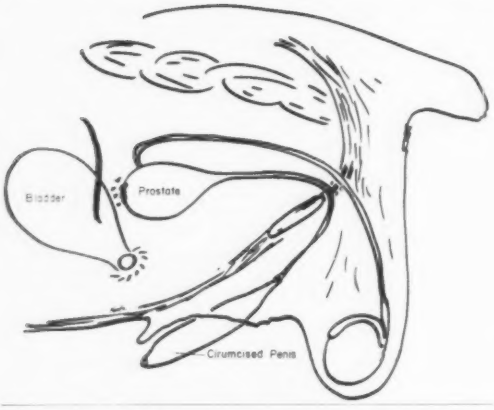

Fig. 2—Cystostomy. The neck of the bladder is sutured to the skin of the lower abdomen, so that urine may be voided at this location.

A catheter is inserted through the penis into the bladder, which is then drained. The catheter is left in position while the routine midline incision is made. The abdominal muscles are separated and the bladder and prostate are exposed. The catheter is withdrawn after the urethral transection is made at the cranial aspect of the prostate gland. A purse string suture is used to invaginate and seal off the prostatic urethral opening. A stab wound should be made about 2 inches lateral to the midline and as far forward as the preputial orifice. The urethral end of the bladder is drawn through the stab wound and sutured to the skin with a series of interrupted silk sutures. Before the abdomen is closed, a couple of tack sutures of 00 catgut are used to attach the ventral surface of the bladder to the abdominal wall.

Vasectomy is performed close to the prostate. The ductus deferens is separated from its blood supply by careful dissection. Only the ductus deferens is transected. Two ligatures are used about an inch apart on the ductus deferens and a piece about ½ inch long is removed. The bilateral vasectomy eliminates possible contamination of the prostatic fluid by secretions from the testes.

The abdomen is closed in routine fashion. Since the prostatic fluid is to be collected from the penis, it is recommended that the sheath be cut along its ventral border so that the bulb of the penis is exposed. The cut edges are sutured so that the lining of the sheath is attached to the corresponding outer skin of the sheath. This incision causes the penis to swing free and bare like an arm out of a ripped sleeve. In the dog, this operation is called a circumcision (Fig. 3).

Healing is rapid and prostatic fluid under pilocarpine stimulation can be collected within 10 days after surgery.

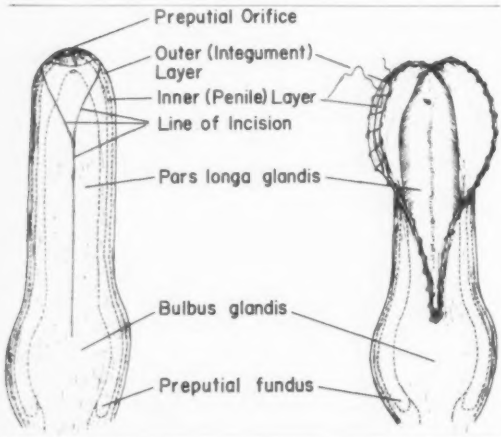

Fig. 3—Circumcision in the dog.

Cystoileostomy

This surgical procedure was first developed to combat the high mortality of experimental dogs which occurred when Huggins' brass cannula was used for urinary diversion (Fig. 1).[5] Basically, the technique consists of creating urinary diversion by means of an ileal segment leading from the fundus of the bladder to the outside and thus eliminating the Huggins brass cannula (Fig. 4).

The initial step is the creation of a Thiry's fistula without sealing off the free end hanging in the abdomen. A 15-cm. segment of ileum is resected about 6 to 7 cm. cranial to the ileocecal valve, and the continuity of the bowel restored by anastomosis. The caudal end of the segment is brought to the outside through a stab wound in the right lateral abdomen 6 to 8 cm. from the midline and on a level with the preputial orifice. The seromuscular layers of the cut end of the ileum are sutured to the skin in a manner previously described.[4] The prostatic urethra between

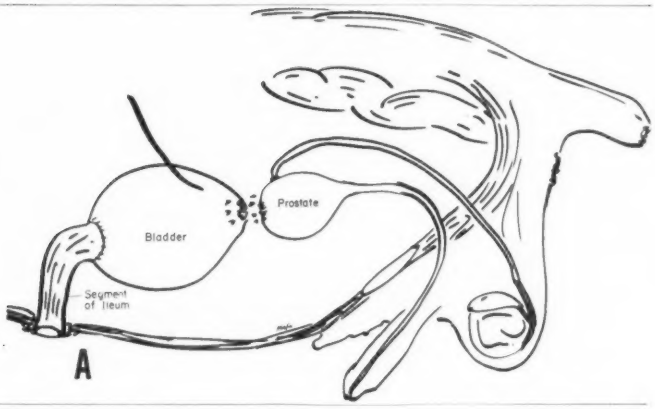

Fig. 4a—Cystoileostomy using the fundus of the bladder.

bladder and prostate is next transected close to the gland, and the cut ends are each separately invaginated and sealed off. The cranial end of the ileal segment is anastomosed to the opened bladder wall at its fundus, and thus diversion of urine is established. The dog is circumcised, and collection of prostatic fluid is by way of urethra and penis.

This procedure was modified by dividing the surgery into two separate operations and by using the vesical neck instead of the fundus of the bladder as the attachment to the ileal segment.

The first operation is merely the creation of a true Thiry's fistula, whereby the caudal end of the ileal segment is brought to the outside, and the cranial end is invaginated and sealed off. The abdomen is closed and the ileal segment is left hanging free in the abdomen. The second stage is undertaken 10 to 14 days later. At this time, the bladder and prostate are separated by transection of the prostatic urethra close to the gland. The prostatic urethra is invaginated and sealed off. The free cranial end of the Thiry's fistula is located and an opening made into its lumen at the side of the sealed end to compare in diameter with that of the neck of the bladder. These openings are united with everted mattress sutures.

This modification, we feel, is somewhat safer in that the animals appear to bear the double operation better than the combined surgery. Another additional feature is that instead of total incontinence one can expect about 50 to 60% continence prob-

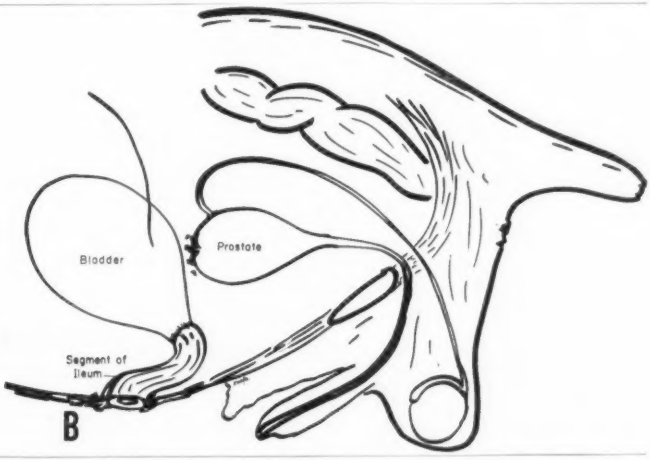

Fig. 4b—Cystoileostomy using the neck of the bladder.

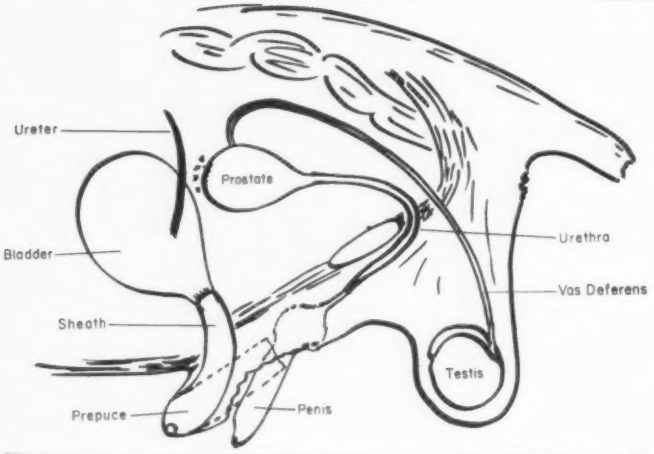

Fig. 5—Cystopreputiostomy in the dog. The lining of the sheath is used as the urethra.

ably due to the action of the vesical neck sphincter.

Cystopreputiostomy

Essentially, this surgical procedure is accomplished by removing the penis from its sheath at its proximal attachment. The bladder and prostate are separated by transecting the urethra. The bladder neck and the sheath are then united so that the preputial sheath serves as a urethra to the bladder (Fig. 5).

Fig. 6—Cystopreputiostomy. Urination takes place through the sheath.

The prepuce of the dog is formed by a double fold of tissue which resembles the skin on its outer surface. When it folds in to cover the penis, it resembles a glistening mucous membrane. In dogs, balanitis is common, and in order to prevent this material from contaminating the prostatic fluid during its collection it was suggested by one investigator that a type of circumcision be performed to get rid of this nuisance and to make it easier to introduce the then free end of the penis into a suitable receptacle. Since the circumcision destroyed this sleeve of the inner lining of the prepuce, it was suggested that it be left intact as a tube and used as the external urethra just as the loop of the ileum had been used to replace the normal urethra.

The inner sleeve of the preputial sheath is attached to the penis in the form of a cuff around the proximal end of the bulb of the penis. It is also attached to the outer portions of the sheath. This connection is by loose, fibrous, but easily separated tissue. Thus the isolation of the inner sleeve is performed by incising the outer portion of the sheath from a point 3 cm. posterior to the tip of the prepuce and continued posteriorly past the bulb of the penis. The incision must not pierce the inner sheath until the attachment to the penis is reached. This is severed and the portion of the sheath which is attached to the abdomen is dissected away. The bare penis is then

Fig. 7—In cystopreputiostomy, prostatic fluid is collected from the exposed penis.

pulled out of its penile sheath and laid aside until the abdomen is closed.

The usual midline incision is then made through the abdominal muscles to gain entry into the abdomen. The urethra is transected between the bladder and the prostate, keeping the incision as close to the prostate as possible. The incised prostatic urethra is sealed by invaginating sutures. The neck of the bladder is aligned to the opening in the preputial sheath which has been lowered into the abdomen. By placing a series of mattress sutures starting through the outer layer of the bladder neck and the preputial sheath, a union is made with all the edges everted. A polyethylene catheter is left in the sheath and bladder for seven to ten days. It is sutured to the inside of the sheath near the preputial opening but far enough inside so that the dog cannot bite the sutures. Abdominal closure is routine and, with practice, the surgery can be done with so little tissue damage that a Penrose drain is not required.

It is also possible to connect the tube of the preputial sheath to the fundus of the bladder rather than to its neck. Figures 6 and 7 illustrate the completed surgery and the method of prostatic fluid collection.

Prostatostomy

The techniques for this surgery were developed in 1953 and involved translocating the prostate to a subcutaneous position in the perineum of the dog.[2] By bringing the bladder end of the prostatic urethra through the perineum to the skin to establish a fistula, prostatic secretion could be collected and the gland freely palpated under the skin. The translocation had its own difficulties, but the principal deterrent was that the bladder still had to be drained by an indwelling cannula.

The prostate has been completely iso-

Fig. 8—Prostatostomy.

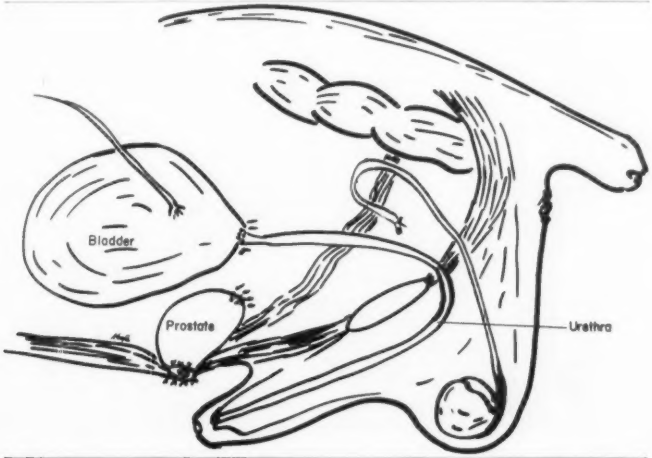

Fig. 9—Prostatostomy. The subcutaneous site of the prostate with its small fistula is shown.

lated by severing the urethra at both poles of the prostate, sealing off the pelvic end, and making a fistula of skin through the abdomen to the open end of the prostatic urethra.[3] The bladder urethra was then anastomosed to the free end of the pelvic urethra and thereby served as a satisfactory urinary outlet (Fig. 8).[3]

We have slightly modified the procedure as follows. The dog is prepared for surgery and anesthetized. A suitably sized splinting catheter, size 8 to 12, is inserted to drain the bladder. An abdominal skin incision is made starting between the umbilicus and the preputial opening and is continued parallel to the midline until the brim of the pelvis is reached. The subcutaneous tissues alongside and under the prepuce are separated by blunt dissection until the entire median raphe is exposed, along which the abdominal wall is incised posteriorly to the pubic bone.

The incision is opened wide with a Babcock retractor, and a thick sponge rubber pack inserted transversely at the cranial end of the opening to keep intestines, omentum, and spleen out of the field. This procedure leaves one with a clear view of large bowel, bladder, ureters, prostate gland, and spermatic cords. It is wise to

Fig. 10—In prostatostomy, the funnel is in place for the hour-long collection of prostatic fluid.

perform bilateral vasectomy at this stage while the field is clear of blood.

The pelvic urethra is hidden by a mass of fatty tissue. The bladder is grasped at its fundus with intestinal forceps, drawn cranially, and fixed so that the long axis of the bladder, prostate gland, and pelvic urethra are in a fairly rigid straight line. The fat and peritoneum are stripped away from the prostate gland posteriorly, giving a clear view of both the gland and its junction with the pelvic urethra. Two long traction sutures of 00 silk are next placed into the sides of the pelvic urethra about ½ inch caudal to its prostatic junction. These are necessary to prevent the pelvic urethra from retracting into the pelvis after it has been severed from the prostate. They are also a great help in maintaining the cut end of the pelvic urethra in position while anastomosing it to the bladder. All adjacent soft tissues are dissected from around the circumference of the pelvic urethra as far caudad as possible. The catheter is withdrawn until clear of the anticipated area of transection, and the urethra is transected as close to the prostate as possible. The caudal, cut end of the prostate gland is immediately invaginated and sealed off with 00 catgut to control the expected copious hemorrhage from the gland itself.

Attention is now centered on the vesicoprostatic area, and a similar urethral transection is made as far up the neck of the bladder as possible without interfering with the ureteral orifices. The freed cranial end of the prostatic urethra with its attached portion of bladder neck is lightly clamped to stop hemorrhage. The prostate gland is separated by these steps from its cranial and caudal attachments and is quite free except for the two neurovascular pedicles attached to its dorsal surface. These must be preserved to maintain the gland's blood and nerve supply. The prostate gland is now drawn to one side, while the bladder neck is anastomosed to the pelvic urethra, using 3 or 4 mattress sutures of 000 catgut. The catheter which served as support for the anastomosis is now passed well into the bladder, but not contacting the fundus wall, and securely fixed in this position by suturing the orifice of the penis to the catheter. The prostate gland is drawn up into the caudal angle of the incision and external to the abdominal muscles. A Penrose drain is placed in the area of the vesicourethral anastomosis, and its free end is brought through the abdominal incision. The abdominal muscles are closed with 00 catgut sutures, making certain, on the one hand, that the prostatic neurovascular pedicles are not occluded by the muscle walls and, on the other hand, that the prostate gland cannot slip back into the abdomen. Skin closure commences at the caudal angle, using interrupted sutures with 0 silk, until the prostatic urethra with attached bladder neck is reached. This opening is sutured to the skin with 000 catgut in the classic method of forming a fistula and the skin closure is completed. Postoperative antibiotic therapy is established and, for the first few days, postoperative urine drainage is via catheter and Penrose drain. The Penrose drain is removed in one week, and the urethral catheter in three to five days. Final position of the prostate gland fistula and the method of collecting the fluid are shown (Fig. 9 and 10).

Discussion

The surgical variations for the isolation and collection of prostatic fluid may be improvised ad infinitum, but one must eventually concentrate on using those methods which are practical and fill the needs of the surgeon or the demands of the experiment.

TABLE 1—Evaluation of Surgical Techniques for Prostatic Fluid Collection

	Cystostomy	Cystoileostomy	Cystopreputiostomy	Prostatostomy
No. of dogs	2	2	5	26
Ease of surgery	Simple	Complex	Simple	Moderately difficult
Convalescence	Rapid (5 days)	Slow (21 days)	Rapid (7 days)	Slow (14 days)
Survival time of patient	3 to 6 months	6 to 12 months	2 to 3 yr.	2 to 3yr.
Continence	None	50%	75%	95%
Complications	Urine scalds; ascending infection with nephritis and uremia.	Urine scalds; ascending infection with nephritis and uremia	Paraphimosis or irritation of bare penile surface	Closure of the fistula and occasional slight bleeding from the prostate, which contaminates the secretion

The technique of prostatostomy was used in the majority of our dogs (26 out of 35) and has proved satisfactory. The technique of cystopreputiostomy is still being developed and may prove highly satisfactory.

The evaluation of the surgical technique (Table 1) must be guided by the various factors as listed. Each trial will dictate its own needs. A comparison of biochemical constituents in the prostatic fluid obtained from dogs with fistulas prepared by the various surgical techniques has been carried out.

Summary

Various surgical techniques for the isolation and collection of canine prostatic fluid were tried on 35 dogs: cystostomy (2), cystoileostomy (2), cystopreputiostomy (5), and prostatostomy (26). Evaluation of the various techniques indicate that prostatostomy and cystopreputiostomy are the most useful.

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Urolithiasis in Dogs

According to studies made in Great Britain, neither sex is more prone than the other to canine urolithiasis. Most stones found in the male dog were composed of urates, oxalates, or cystine. Obstruction occurred in the urethra where it enters the groove in the os penis. In the bitch, cystitis of varying severity resulted principally from phosphate calculi in the bladder. Cystine stones were found in male dogs only. Calculi in Dalmatians were mainly urates.

According to reports from the London and Liverpool veterinary schools, the Dachshund, Cairn Terrier, Welsh Corgi, and Scottish Terrier had the highest incidence of calculi (6%). The lowest incidence occurred in the Alsatian, Collie, Bull Terrier, Boxer, and Chow (<1%). The incidence in dogs of mixed breeding was relatively low (1%).—*J. Comp. Path. & Therap., 71, (April, 1961): 215.*

Clinical Incidence of Genital Abnormalities in the Cow

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R. P. S. Bhalla, R.V.C.

WHEN PRESENT and potentially capable of interfering with reproductive function, genital abnormalities can be utilized as a basis for diagnostic, prognostic, and therapeutic considerations. This and the scarcity of reports on clinical incidence of genital abnormalities indicated a need for publication of such information. The present study was undertaken to determine the relative incidence of clinically detectable abnormalities of the female reproductive organs in a relatively large cattle population.

Materials and Methods

The data serving as the source of the information in this report originated from records of genital examinations conducted by the staff of the division of veterinary obstetrics from 1955 to 1960. The majority of cattle examined belonged to 14 dairy herds in Minnesota and western Wisconsin participating in a fertility examination program. Due to location, production, and status of management and nutrition, these cattle were considered a representative sample of the better dairy cattle in the area. Of the herds participating in the program, two were Guernsey, two Jersey, one Milking Shorthorn, and nine Holstein-Friesian. Natural breeding was employed in five of the herds and, in the remaining nine, artificial insemination. All cattle were examined at least twice during each reproductive cycle, each cow being subjected to a postpartum or preservice examination and a pregnancy examination. Cows with health problems were given additional attention. All findings were recorded on individual record cards.

Most of the examinations were conducted by the two senior authors.

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Approved for publication as scientific journal series paper No. 4601, Minnesota Agricultural Experiment Station, St. Paul.

Results and Discussion

A total of 20,913 examinations were recorded during the observation period. The incidence of abnormalities grouped according to the anatomical site was determined (Table 1).

Abnormalities involving the ovaries represented the majority of detected genital defects (54.3%) and were found in 7.9% of all examinations. Cystic degeneration of the ovaries was the most prevalent abnormality diagnosed. Follicular cysts were observed in 4.0% and luteal cysts in 1.7% of all examinations. The total 5.7% incidence of cystic degeneration of the ovaries is markedly low when compared with data from reports of others (Table 2). The actual incidence of this disease in the cattle observed in this study might be expected to be still lower since examinations rather than individual cows were considered as basal units in the calculation of incidence. The main reason for this discrepancy might be the differences in composition of the cattle populations observed. The data of others might have originated from accidentally selected populations of cattle; observations of this study came from randomly selected cattle. Marked increases in frequency during recent years, as reported by some, were not noticeable in this cattle population.[7-21] However, annual fluctuations in the incidence of cystic degeneration of ovaries were observed in individual herds.

The next most frequently encountered ovarian abnormality was hypoplasia, which was found in 1.9% of all examinations. The diagnosis of this congenital defect was made after careful diagnosis of underdeveloped ovaries of the acquired type. Bilateral and unilateral right involvement of the gonads was not encountered. The

abnormality was found in cows of all breeds represented. An excellent description of this disease in the Swedish Highland breed has been reported.[13,14] Beyond mention of this abnormality by two workers,[9,21] hypoplasia of ovaries has not received further attention in this country. The relatively high incidence of this disease observed in this study indicates the need of considerably more concern, particularly in regard to its hereditary aspect.

Ovaritis was observed in 65 cases and was found in 0.3% of all examinations. More than one half of the cases of this disease were bilateral and associated with "repeat breeding" and sterility. This abnormality has been discussed previously but without reference to its incidence.[21] The lack of data in the reviewed literature might reflect a low incidence. This lack might, however, be due to inadequate consideration during genital examination.

Granulosa cell tumor was found in 6 cattle. One was a heifer 13 months old with marked udder development. All remaining cases were found in aged cows, all of which had signs characteristic for cystic degeneration of the ovaries. Two cows were half sisters with histories of cystic degeneration of ovaries during their previous reproductive cycles. Similar observations have been reported.[13,16,21]

Diseases of the oviduct, ovarian bursa, and surrounding structures were classified according to clinical rather than pathologic alterations. The diagnosis of hydrosalpinx was used in all cases in which appreciable enlargement of the Fallopian tubes was present. Perisalpingitis on the other hand was employed when changes involving the surrounding tissues were present. The former diagnosis was made in 0.2% of the examinations, whereas perisalpingitis was diagnosed in 237 examinations (1.1%). The clinical data available in the literature and that summarized here (Table 3) reflect both abnormalities. The incidences reported are considerably higher than the frequency of abnormalities of the oviduct encountered in the present study. One of the reasons for the low incidence found here might be that manipulations in the form of enuclea-

TABLE 1—The Incidence of Anatomical Abnormalities of the Genital Tract in the Cow

Abnormality and the organ involved	Total No. of cases	Total abnormalities (%)	Total cases (%)
Ovaries			
Hypoplasia	389	12.9	1.9
Follicular cysts	827	27.2	4.0
Luteal cysts	364	12.0	1.7
Ovaritis	65	2.1	0.3
Granulosa cell tumor	5	0.1	....
Subtotal	1,650	54.3	7.9
Oviducts			
Hydrosalpinx	37	1.2	0.2
Salpingitis, perisalpingitis	237	7.8	1.1
Subtotal	274	9.0	1.3
Uterus			
Uterus unicornis	2	....	....
Chronic nonproductive metritis	647	21.3	3.1
Pyometra	206	6.8	1.0
Parametritis	16	0.5	0.07
Subinvolution	52	1.8	0.2
Leukosis of uterus	3	....	....
Subtotal	926	30.4	4.37
Cervix			
Cervix duplex	2	....	....
Chronic cervicitis	127	4.2	0.6
Paracervicitis	21	0.7	0.1
Subtotal	150	4.9	0.7
General, congenital			
Freemartinism	29	1.0	0.1
White heifer disease	9	0.3	0.04
Subtotal	38	1.3	0.14
Total	3,038	99.9	14.41

tion of the corpus luteum and rupture of ovarian cysts are employed with extreme care and only in a few selected cases.

Uterus unicornis was recorded in 3 cattle; all were low in fertility.

Acute inflammation of the uterus was not encountered. The chronic inflammations of the uterus were classified on the basis of the presence or absence of exudate in the uterus. The diagnosis of pyometra was used to describe all cattle with appreciable accumulation of exudate in the organ. The remaining cattle were classified as chronic nonproductive metritis. Although these terms are not completely accurate, they appeared to describe satisfactorily the clinical situations encountered. Chronic nonproductive metritis in this study was diagnosed in 3.1% of all examinations, representing the second highest incidence of a single abnormality. The reports in the literature on this type of chronic metritis originate from studies in either infertile or slaughter animals. The data obtained either by postmortem or biopsy technique are compiled (Table 4). No reports are available from randomly selected populations. Thus data for comparison with the findings of this study are lacking.

Pyometra was observed in 206 examinations (1.0%). This incidence is considerably lower than that published in 1948, in which pyometra had been observed in 3.2% of the cows. Improved puerperal hygiene might be responsible for the decrease in the incidence of this disease.

Subinvolution of the uterus, characterized by the failure of the organ to involute within four weeks after parturition was diagnosed in 52 examinations (0.2%). Data for comparison were not found in the reviewed literature.

Parametritis and perimetritis was found in only 16 examinations, whereas leukotic lesions in the uterus, another rare condition, was found in 3 cows. One of the latter attracted special attention because of the signs of pregnancy found in one horn, whereas gross leukotic lesions were restricted to the nonpregnant horn of the uterus.

Among the abnormalities involving the cervix, double cervix (cervix duplex) was found in 2 cattle. A much higher incidence has been reported by others.[13,14,22] Since these latter data originate from a selected group or breed, the discrepancy with the results of this investigation might serve as additional circumstantial evidence for the hereditary nature of this disease.

TABLE 2—Incidence of Cystic Degeneration of Ovaries—A Review

Method of examination	No. cows examined	Incidence	
		Total	%
Clinical[3]	341	64	18.8
Clinical[5]	683	60	8.9
Clinical[7]	189	48	25.4
Clinical[10]	44	16	36.3
Clinical[11]	154	24	15.5
Necropsy[12]	6,286	Not given	14.8
Clinical[15]	Not given	Not given	12.0-14.0
Necropsy[19]	1,000	...	3.06

Chronic cervicitis in the form of detectable changes of the size, shape and consistency of the structure was observed in 127 examinations comprising the third largest group of recorded abnormalities. A 1.46% incidence of cervicitis in 683 clinically examined problem cows and an 8.9% incidence of the disease in the 1,000 cows examined at necropsy have been reported.[5,19] The differences between these data and the results of this study appear to be due to the different composition of the cattle populations examined, as well as to the different methods of examination employed.

TABLE 3—Incidence of Disease of the Oviduct—A Review

Method of examination	No. cows examined	Incidence	
		Total	%
Clinical[2]	1,221	187	15.3
Necropsy[4]	1,030	70	6.8
Necropsy[17]	1,622	251	15.5
Clinical[17]	516	25	4.8
Clinical[18]	2,655	444	16.7
Clinical[21]	1,250	50	4.0
Clinical[7]	252	83	51.5

Paracervicitis was recorded in 21 examinations (0.1%).

Of the general congenital abnormalities, freemartinism was diagnosed in 29 cases. This abnormality is well-known by most cattle breeders, who are also well aware of the probability with which freemartinism might be expected in the fraternal twins of unlike sexes. Therefore, any clinical data on the frequency of this disease are more likely reflecting the willing-

TABLE 4—Incidence of Chronic Metritis—A Review

Method of examination	No. cows examined	Incidence	
		Total	%
Biopsy[3]	110 (sterile)	77	70.0
Clinical[7]	157	47	29.9
Biopsy[3]	82 (sterile)	38	46.0
Necropsy[19]	1,000	Not given	5.3

ness of the breeder to gamble on the outcome rather than the true incidence of the abnormality in a given population.

White heifer disease was observed in 9 cattle. Four of the cases were found in Milking Shorthorns, two each in Holstein-Friesians, and Guernseys, and one in a Jersey heifer. White heifer disease in small closed groups of cattle has been described.[8,23] Any reports indicating the incidence of this abnormality in larger cattle populations were not found in the reviewed literature.

Summary

1) A total of 20,913 genital examinations were conducted in cattle of Holstein-Friesian, Guernsey, Jersey, and Milking Shorthorn breeds.

2) Abnormalities of the reproductive organs were found in 3,038 examinations (14.5%).

3) The incidence of five most common abnormalities in the order of their magnitude were: (*a*) cystic degeneration of ovaries (5.7%); (*b*) chronic nonproductive metritis (3.1%); (*c*) hypoplasia of the ovaries (1.9%); (*d*) abnormalities of the oviduct (1.3%); and (*e*) pyometra (1.0%).

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Urethral Occlusion in Lambs on Feed Containing Stilbestrol

Hadleigh Marsh, D.V.M.

URETHRAL occlusion in feedlot lambs implanted with 12 mg. to 15 mg. of stilbestrol has been reported.[2,7,9,10] In two other reports associating urethral occlusion in lambs with stilbestrol administration, the hormone was incorporated in the feed at a rate of 5.0 mg. per lamb daily in one instance[4] and 0.5 mg. per pound of feed in the other.[1] The cases associated with stilbestrol in the feed occurred in small experimental lots of lambs in which the incidence of the condition was low.

In this article, we are reporting the occurrence of urethral occlusion in lambs in a commercial feedlot, which were given feed containing stilbestrol. On Dec. 8, 700 lambs were started on fattening whole-ration pellets which contained 0.5 mg. of stilbestrol per pound. The lambs were fed on a self-feeding basis; there was always more feed in the bunks than was being eaten. They consumed the pellets at the rate of about 4 lb. per lamb per day, which resulted in an average daily dose of 2 mg. of stilbestrol to each lamb. Salt and a mineral mixture were available separately. The owner reported that the lambs consumed the mineral freely and salt at the rate of 40 lb. per day, or 1 oz. per lamb. He also reported that they drank water freely.

Clinical History and Gross Pathologic Findings

After four weeks on feed, clinical signs of retention of urine began to appear, and on January 15 the owner reported that 60 lambs had "water-belly" and that some had died. A veterinarian examined 2 lambs postmortem and was unable to find calculi. The owner brought 5 lambs to the laboratory. Three had excess fluid in the abdomen and were making no attempts to urinate, indicating bladder rupture.

These 3 lambs were killed for necropsy. In each of them, the bladder was ruptured, and there was a large amount of blood-stained urine in the peritoneal cavity. Each lamb had a large blood clot at the point of rupture. The kidneys were normal grossly. Calculi were not found in the urinary tract.

In one lamb, no occluding material was present in the urethra, and it was concluded that the obstruction must have been in the neck of the bladder to cause the bladder rupture. In the second lamb, the urethra was filled from the sigmoid flexure to the processus urethrae with a soft colorless material having a fine grittiness when rubbed between the fingers. Similar material was present in the blood clot in the bladder. This material was identified as mucoprotein. In the third lamb, the urethra was free from any content except for a small amount of the mucoprotein material occluding the processus urethrae. There was no inflammation in the urethra of any of the 3 lambs on which necropsies were made.

In these lambs, there was marked enlargement of the secondary sex glands, particularly the seminal vesicles and the bulbo-urethral glands. The pelvic portion of the urethra was also enlarged by thickening of the urethral wall.

Changes in the Accessory Sex Glands

Hypertrophy of the seminal vesicles and ampullae in lambs given 12-mg. implants of stilbestrol has been reported.[8] Measurements of the dimension of the secondary sex organs of 80 lambs given implants of 15 mg. stilbestrol and 60 controls given no stilbestrol showed marked hypertrophy of the seminal vesicles, ampullae, urethras, and bulbo-urethral glands of the treated

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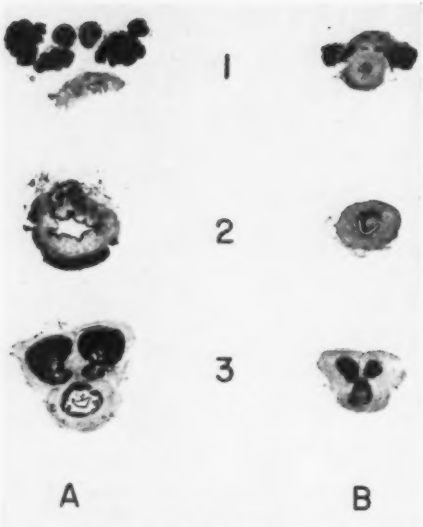

Fig. 1—Sections of seminal vesicles and ampullae (1), pelvic urethras (2), and bulbo-urethral glands (3) of stilbestrol-fed lambs (A) and of lambs of similar age and breeding not fed stilbestrol (B).

lambs.[2] Increased weights of seminal vesicles and bulbo-urethral glands in lambs fed 5 mg. of stilbestrol daily have been reported.[5] Enlarged secondary sex organs and decreased urethral lumens in lambs fed 0.5 mg. stilbestrol per pound of feed have been reported.[1]

Measurements were made of the secondary sex organs of 2 lambs on which necropsies were made. These measurements were compared with those previously reported[2] and with the dimensions of the corresponding organs of 4 lambs of about the same age and breeding fed at Montana State College (Table 1). The dimensions of the seminal vesicles, ampullae, urethras, and bulbo-urethral glands of the lambs reported here were similar to those for the corresponding organs of lambs given a 15-mg. implant[2] and greater than those of the previously reported untreated lambs[2] and the untreated lambs at the college.

TABLE 1—Dimensions of Secondary Sex Organs of Stilbestrol-Fed Lambs and Untreated Lambs

Item	Seminal vesicles (mm.)	Ampullae (mm.)	Urethras (mm.)	Bulbo-urethral glands (mm.)
Lamb 1	22.0	5.0	.....	14.0
Lamb 2	20.0	4.0	13.0	12.0
Implanted[2] (Av. of 80 lambs)	22.0 x 15.0	5.2	16.6	15.5
Not treated[2] (Av. of 60 lambs)	11.0 x 5.0	3.5	10.8	8.7
Not treated (Av. of 4 college lambs)	14.5 x 4.3	2.5	11.5	9.6 x 0.3

Measurements of bulbo-urethral glands in lambs fed stilbestrol at several levels have been reported.[6] At 0.6 mg./lb., the diameter of the gland was 13 mm., compared with 7 mm. in lambs given no stilbestrol.

Histologic sections were made of seminal vesicles, urethras, and bulbo-urethral glands of lamb 2 and of 3 of the college lambs which were used for comparative gross measurements (Fig. 1).

In Western Australia extensive metaplasia has been described in the mucosa of the vasa deferentia, prostate glands, urethras, and bulbo-urethral glands of wethers, caused by an estrogenic substance in the subterranean clover on which they were grazed.[3] There was substitution of highly stratified squamous epithelium for the normal columnar or transitional types. In the sections of the stilbestrol-fed lamb studied here, there was no marked metaplasia of the mucosal epithelium.

In lamb 2, the transitional urethral epithelium in the prostate region had some areas in which the surface cells were flattened to the squamous type, but there was no significant metaplasia. The epithelial zone was somewhat thicker than in the untreated lambs, with more tiers of cells. At the bulbo-urethral gland level, the outer one to three tiers of cells were of the squamous type, which may indicate a tendency to metaplasia.

In the seminal vesicles and bulbo-urethral glands, there was hypertrophy in lamb 2. The alveoli were better developed and occupied more area in relation to the supporting connective tissue. This was particularly evident in the bulbo-urethral glands, where the alveoli were lined with larger columnar cells with a relatively large amount of cytoplasm, like the bulbo-urethral epithelium in the ram (Fig. 2 and 3).

Discussion

The necropsy and histologic findings on 3 sheep, combined with the report of the veterinarian who examined 2 others postmortem, led to the conclusion that probably

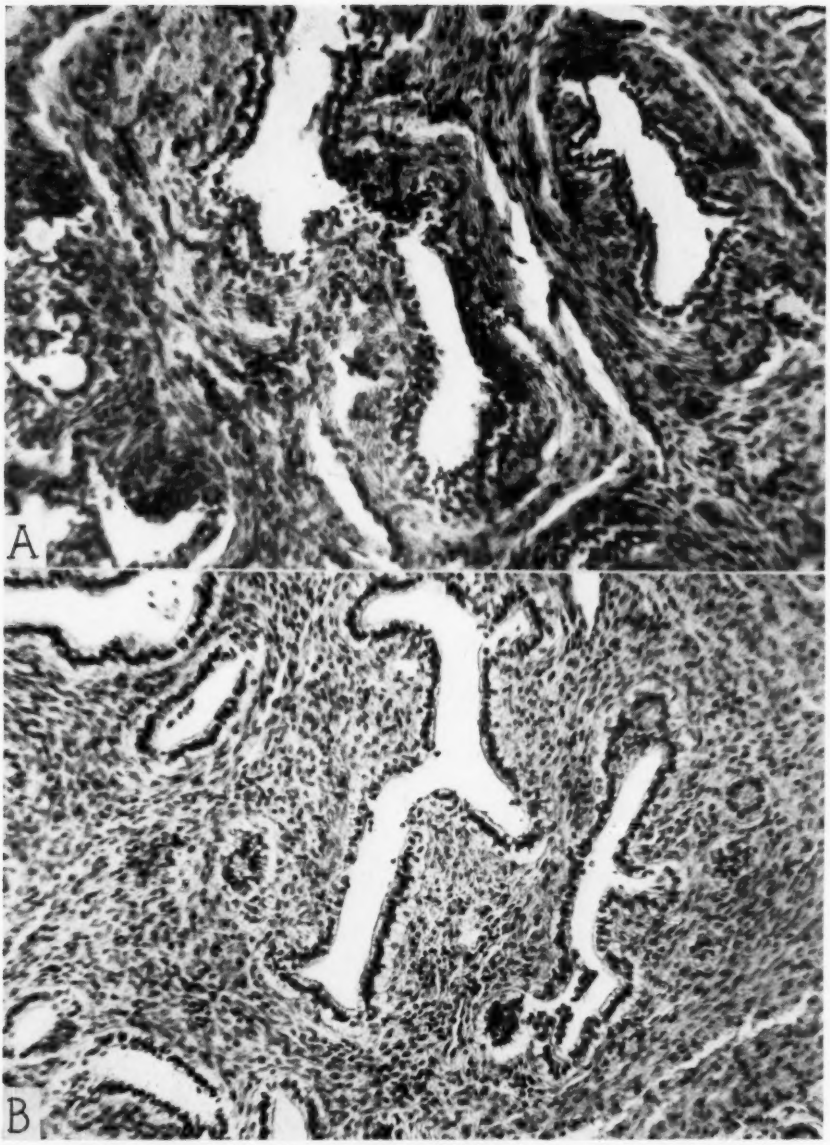

Fig. 2—Sections of seminal vesicles of a stilbestrol-fed lamb (A) and of a lamb of similar age and breeding which was not fed stilbestrol (B). x 190.

the stilbestrol in the feed was responsible for the changes which resulted in urethral occlusion. Although lambs have been fed on feed containing 0.5 mg. of stilbestrol per pound without any apparent ill effects, it is possible that in this case the method of feeding may have been responsible for the undesirable effects of the stilbestrol. At the start of the feeding period, the lambs were cut off sharply from the hay which they had been eating and were started immediately on pellets with no other feed. Apparently, the sheep ate the pellets freely since the owner reported some death loss within

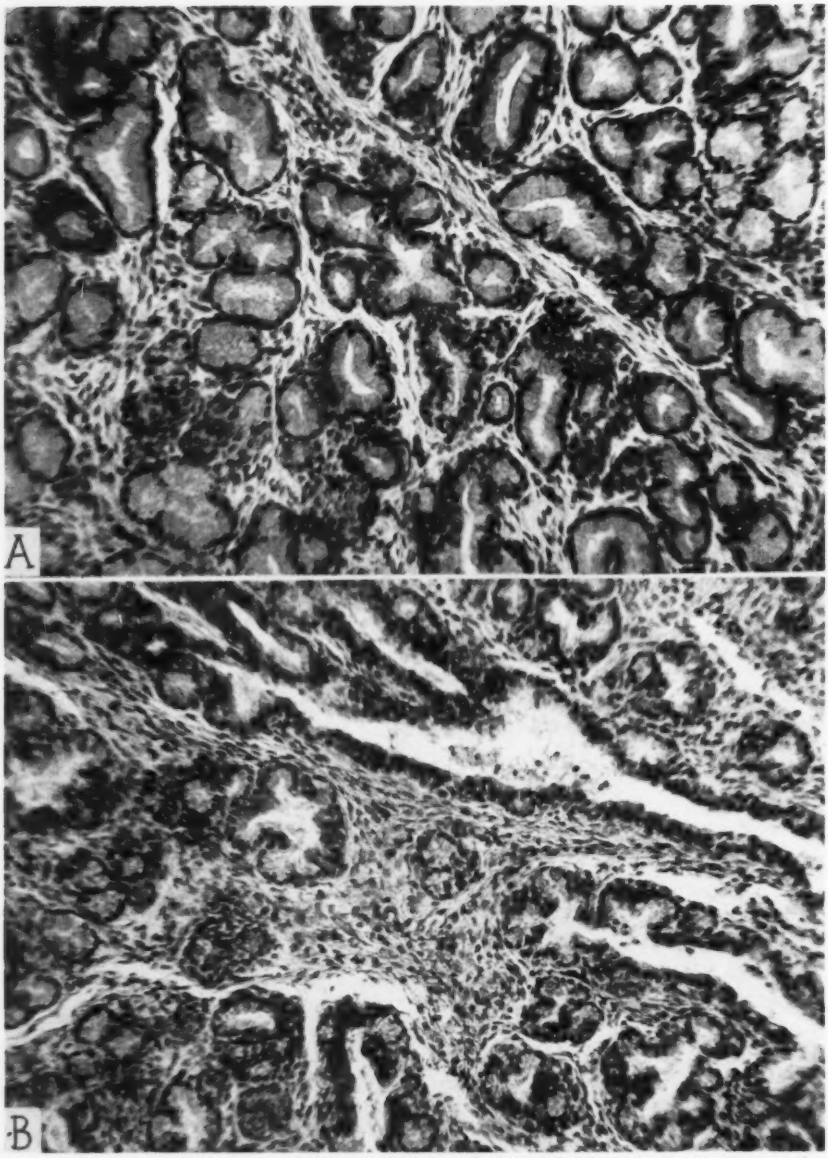

Fig. 3—Sections of bulbo-urethral glands of stilbestrol-fed lamb (A) and of a lamb of similar age and breeding which was not fed stilbestrol (B). x 190.

a few days after starting the lambs on feed. Presumably deaths resulted from consuming too much concentrated feed. Probably the 10% of the lambs which developed urethral occlusions consumed more than their share of the pellets and therefore more than 2 mg. of stilbestrol per day.

The fact that on necropsy of 5 lambs no calculi were found is in accord with a report on a loss of 2,000 of 9,000 lambs from

water-belly associated with stilbestrol implants.[7] According to this report, there were a few stones, but the primary cause of urethral occlusion was considered to be inflammation of the urinary tract. In the other reports of urethral occlusion in lambs given stilbestrol, there was little information concerning the nature of the occlusion. One report[1] ascribes partial occlusion to reduction in size of the urethral lumen caused by enlargement of the accessory glands. It appears probable that in lambs given stilbestrol there is excess production and precipitation of mucoprotein which may lodge in the urinary passages.

Summary

In a lot of 700 lambs being fed fattening, whole-ration pellets containing 0.5 mg. stilbestrol per pound, about 70 lambs had "water-belly." At necropsy, no calculi were found. The urethral occlusions found were due to plugs of precipitated mucoprotein. The seminal vesicles and bulbo-urethral glands were enlarged but, on histologic examination, there was not any marked metaplasia. The stilbestrol in the feed probably was a major factor in the development of urethral occlusion. It is presumed that affected lambs consumed more than 2 mg. stilbestrol per day because the method of feeding allowed the more greedy lambs to eat as much feed as they wanted.

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Treatment of Papillomatosis with Procaine

The therapeutic effect of procaine in papillomatosis was tested in 16 dogs with oral papillomas and on the skin and udder of 22 cows, 3 heifers, and 3 horses. In dogs, 3 to 5 infiltrations of 0.5% procaine beneath the mucous membrane at the site of the papilloma every third day in doses of 5 to 8 ml. had a more rapid therapeutic effect than did intravenous administration. Moreover, there were no side effects such as convulsions and unconsciousness.

In cows, papillomas disappeared after five to six intravenous injections of 1% procaine in doses of 30 to 150 ml., given every fourth day. A more rapid therapeutic effect was achieved by one massive infiltration of the skin and subcutaneous tissues in the area of diffusely scattered papillomas.

In the horse, procaine treatment yielded similar results to those reported in cattle. *Scientific Papers, Sofia, Bulgaria, 8 (1960): 143.*

from the *Research Journal*

Coccidioidomycosis in 3 Coyotes

In 3 of 5 coyotes caught in the desert surrounding Tucson, Ariz., a small single primary focus of coccidioidomycosis was found in the lungs. Contrary to histoplasmosis, in which multiple primary foci in the lungs are commonly seen in nondomesticated and domesticated animals, the incidence of multiple primary lesions in coccidioidomycosis seems to be rare.—[*M. Straub, R. J. Trautman, and J. W. Greene: Coccidioidomycosis in 3 Coyotes. Am. J. Vet. Res., 22, (July, 1961): 811-813.*]

New Books

Animal Health Yearbook

This is an annual report of world livestock diseases, drawn from records of the Foreign Agriculture Organization of the United Nations and the Office International des Epizooties. Disease incidence of the world's livestock, including bees and fishes, are reported and also methods of control employed. Current livestock populations by species and numbers of veterinarians are given for different countries of the world. Special sections on foot-and-mouth disease, contagious bovine pleuropneumonia, African horse-sickness, and selected reports of international significance are appended.

The work is printed in three languages (English, French, and Spanish), along with the Latin technical term for each disease. Most of the book is composed of tables. There is a complete index.—[*Animal Health Yearbook of 1960 of the FAO-OIE. 311 pages. Food and Agriculture Organization of the United Nations, Rome. 1961. Price not given.*]

Merck Veterinary Manual

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It is printed in handbook size on strong, thin paper with a dark red, gold-stamped, durable binding.—[*The Merck Veterinary Manual. Edited by O. H. Siegmund. 2nd ed. 1,600 pages; not illustrated. Merck & Co., Inc., Rahway, N.J. 1961. Price $9.75.*]

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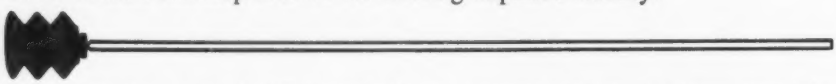

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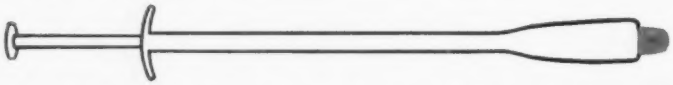

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References: 1. Vigue, R. F., et al.: J. Am. Vet. M. Ass. 134:308 (Apr. 1) 1959.

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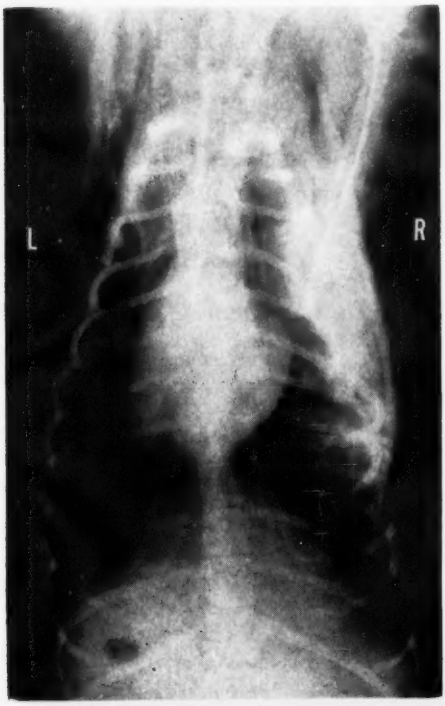

History.—A male Manchester Terrier 3 years old was attacked by a large dog. The owner stated that the large dog picked up the smaller one in its mouth and held it with a "death grip." There was difficulty rescuing the victim.

When examined, the Terrier had signs of severe shock and extreme respiratory difficulty. There was a puffy, crepitating swelling behind the right front leg, but the skin was not broken. The dog was given emergency treatment and, as soon as he could be handled safely, standing lateral and dorsoventral radiographs were taken (Fig. 1, 2).

Fig. 1—Radiograph, dorsoventral view, of the Terrier's thorax.

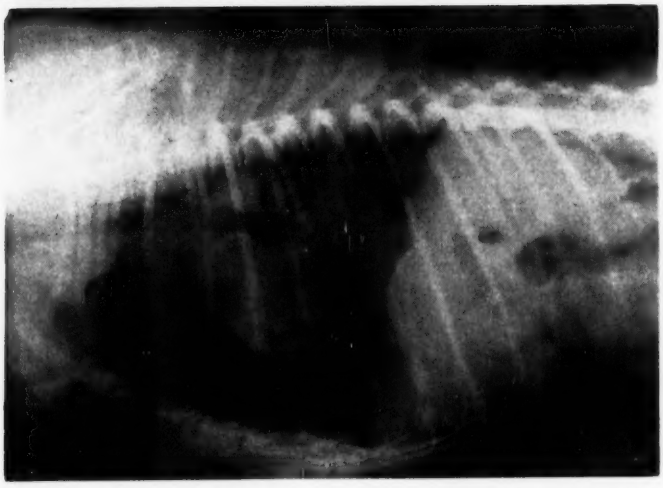

Fig. 2—Radiograph, standing lateral view.

Here Is the Diagnosis

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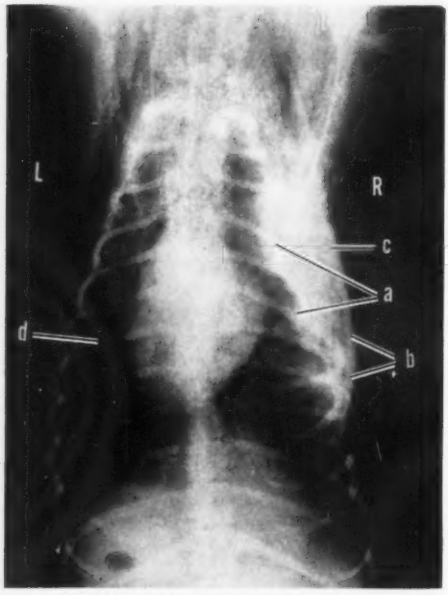

Fig. 3—Radiograph, dorsoventral view; fractured ribs (a), subcutaneous emphysema (b), hematoma (c), and pneumothorax (d).

Diagnosis.—Fracture of at least two ribs on the right, emphysema, subcutaneous hematoma, pneumothorax, and atelectasis of at least one half of the lung area.

This report was submitted by W. H. Rhodes, V.M.D., School of Veterinary Medicine, University of Pennsylvania, Philadelphia, and prepared with the assistance of W. H. Riser, D.V.M., M.S., Kensington, Md.

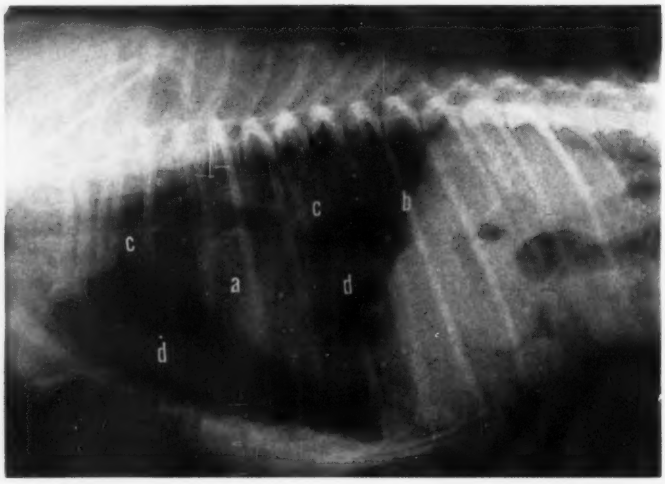

Fig. 4—Radiograph, standing lateral view, showing the heart in an elevated position (a) anterior to the intact diaphragm (b). The lobes of the lungs are atelectatic (c) as a result of pneumothorax (d) caused by air that escaped from the injured lungs.

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History of the AVMA

Emphasizing the "doctrine of unity" at the 1921 meeting in Denver, D. S. White said,

1921

"While admittedly we have made progress . . . . in the last half century, nevertheless I firmly believe it would have been more rapid and fruitful had we been more firmly united . . . . I think sometimes we are too apt to clique off into little, self-interested groups . . . . at cross-purposes . . . . Firmly united the veterinary profession is already weak enough to fight the battles it must . . . . to carry on its legitimate work."

Secretary N. S. Mayo, calling attention to the drop in membership mainly through nonpayment of dues, said, "The general economic depression that prevails has had a marked influence upon our membership . . . . The number of letters expressing financial stress has been much greater than usual."

Some years earlier, the desirability of having an official emblem for the AVMA had been discussed. The USVMA had adopted a seal incorporating a centaur in 1863, but it is doubtful that the AVMA ever considered using this symbol; it was little used in later years of the USVMA, perhaps because it was too "horsey." D. M. Campbell, appointed chairman of an emblem committee in 1915, had reported in 1916 that there was ". . . considerable sentiment for the blue cross," and recommended an emblem incorporating this symbol. Many veterinary supply firms had been using this in various forms.

In 1921, the committee recommended the caduceus with the superimposed V used by the Veterinary Corps. The California V. M. A. had used this design earlier, and H. B. Wintringham of Fresno urged its adoption by the AVMA; it was officially adopted. Later, Dr. Wintringham, and as late as 1960, J. M. Arburua pointed out that this symbol was perhaps less desirable than some other since the caduceus is the staff of Hermes (Mercury), and has more commercial than medical overtones.

Luis Santa Maria, presenting the first paper by a Mexican veterinarian, urged cooperation between the United States and Mexico for control of epizootics; ". . . contrary to what is supposed, the international interchange of livestock . . . . has not been given its due importance from the sanitary point of view." And from Canada, F. Torrance reported that prior to the law of 1915 requiring the cooking of garbage, 90% of hog cholera outbreaks could be traced to this source. "We now have . . . . so far as I know not a single case of hog cholera in the whole of Canada."

Other papers included those by F. B. Hadley, E. Records, L. R. Vawter, H. E. Kingman, Sr., F. R. Beaudette, H. R. Smith, G. H. Glover, H. P. Hoskins, I. E. Newsom, F. Cross, and M. C. Hall. The first of a notable series of studies by A. F. Schalk and R. S. Amadon, "Gastric Motility Studies in the Goat and the Horse," was presented (published, 1921).

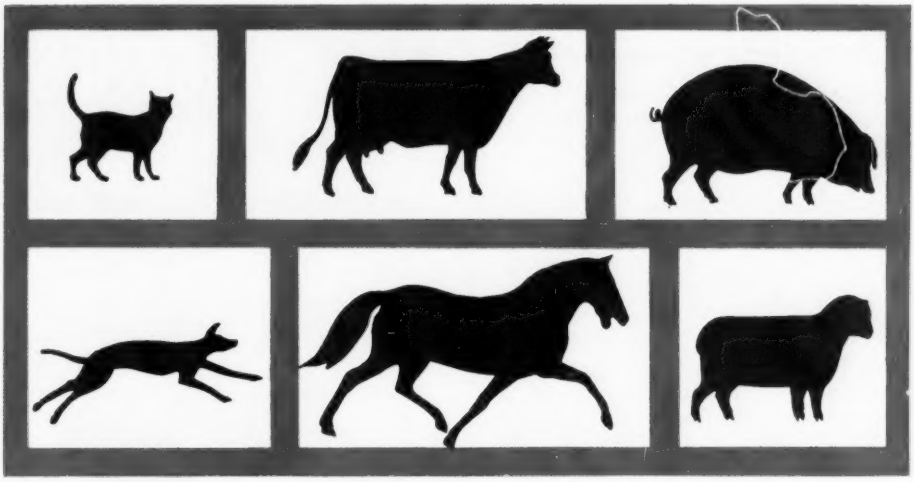
✦ ✦ ✦

DAVID STUART WHITE was born Sept. 28, 1869, in Staten Island, N.Y., received his veterinary degree from Ohio State University in 1890, and continued his studies in Europe under such men as Dieckerhoff, Moller, Frohner, Gunther, and Lungwitz. He returned to Ohio State in 1893, and was dean of the College of Veterinary Medicine from 1895 to 1929.

Dr. D. S. White

In October, 1917, he was commissioned a Major in the Veterinary Corps, became Chief Veterinarian of the A.E.F. in France, and was the first veterinarian to achieve the rank of Colonel. He effected a transfer of the Veterinary Corps from the Quartermaster Corps, under which it was operating in France, to the Medical Corps. He was decorated by the governments of France and England, and was made an Honorary Associate of the Royal College of Veterinary Surgeons.

Long a leader in AVMA and college circles, Dr. White served as president of the AVMA (1920-21) and wrote a textbook, *The Principles and Practice of Veterinary Medicine*. Dr. White died on Jan. 7, 1944.



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AVMA Research Fellowships Available

The Council on Research of the AVMA announces the availability of a number of fellowships for postgraduate training for the academic year, 1962-1963.

The recipient of a fellowship must be a veterinarian and a citizen of the United States or Canada. Veterinary students who expect to graduate at the end of the current school year and who wish to follow a career in research may apply for a fellowship.

It is advisable that completed application forms be filed by Jan. 1, 1962, to allow time for correcting omissions and for some reasonable delay in arrival of letters of information from third parties. The latest date for filing the completed application is Feb. 1, 1962. Approximately one month is required for processing completed applications after receipt by the Council. Qualified persons should secure and submit applications as early as possible to insure their file being complete for presentation to the Committee on Fellowships.

The Committee on Fellowships of the Council on Research will meet early in March to consider applications and the awards will be announced soon afterward. The stipend will be determined in each case by the needs of the individual, the location of the school in which he proposes to work, and other factors. In general, the stipends range from $100 per month upward. Any qualified person interested in graduate training may obtain application blanks and other information from the deans of the various colleges of veterinary medicine or by writing to the Council on Research, American Veterinary Medical Association, 600 S. Michigan Ave., Chicago 5, Ill.

APPLICATIONS

Applicants Not Members of Constituent Associations

In accordance with paragraph (c) of Section 1, Article I, of the Bylaws, the names of applicants who are not members of constituent associations shall be published in the JOURNAL. Written comments received by the Executive Secretary from any active member regarding the application as published, will be furnished to the Judicial Council for its consideration prior to acceptance of the application.

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Public Relations

AVMA To Begin Revised, Expanded PR Program

The public relations phases of Dr. Mark L. Morris' Blueprint for Action program, outlined at the House of Delegates sessions in Detroit in August, have begun to take shape with a monthly Newsletter, revised information kits, and an intensified career recruitment program.

The Newsletter, which will go to secretaries of constituent associations, editors of veterinary journals, deans of veterinary schools, and public relations representatives of state and local associations, will contain material which can be abstracted or revised for local use.

It is hoped that the Newsletter can become a semimonthly publication soon, providing fresh information for veterinary associations and their members. Sources will be given with all material so that the original article can be referred to for further development.

The information kits, replacing the largely obsolete Speakers Kits, will cover the same subjects as well as new material. The kits will be factual in nature, permitting the state and local associations the greatest flexibility in manner and type of presentation.

Use of these kits will enable the local associations to have the material needed for meaningful presentations without a rigid format. Thus they can be used by individuals and groups in all media as well as for personal presentation to live audiences.

The AVMA public information staff will work closely with Dr. James R. Hay, director of professional relations, in the development of an extensive career recruitment program. It will be designed, as are all of the programs, so that it can be carried out at the state and local level under the guidance and assistance of the AVMA through a series of brochures, exhibits, and other materials which will attract superior students to the profession. This program was developed under instructions from the House.

More meaningful assistance by the auxiliaries in the public relations work to be done was discussed by the director with the Executive Board of the Women's Auxiliary. State secretaries will soon receive results of an AVMA survey on the use of auxiliaries, along with suggestions on how they can assist in carrying out the public relations task.

The recent employment of an assistant director of public information will enable the AVMA to put into action the recommendations of Dr. Morris and the House regarding the public relations program.

Humphrey Report—"Must Reading" for Every Veterinarian

The recent Senate Government Operations Subcommittee report on "Veterinary Medical Science and Human Health" can be one of the most useful public relations documents printed in many years, for the subcommittee, under the chairmanship of Sen. Hubert H. Humphrey (D., Minn.), has created a veritable handbook on the importance of the profession.

The 244-page report, 11th in a series of reports issued by the subcommittee, is available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C. It costs 65 cents per copy.

The House of Delegates in Detroit passed a resolution endorsing the report

(Continued on p. 1038)

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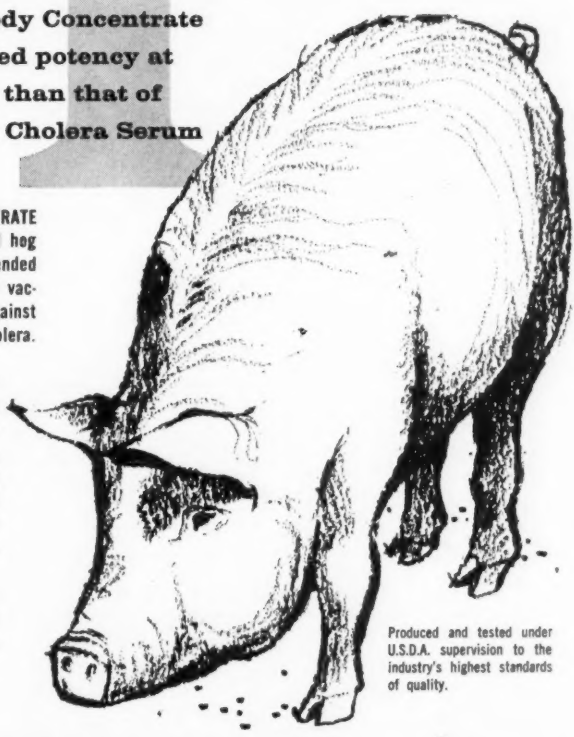

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PR Page—*Continued from page 1036*

and commending Senator Humphrey and members of the Subcommittee on Reorganization and International Organizations on their "excellent presentation of the need for long-range, well-funded, and coordinated federal-state research efforts cross-seeding the biomedical research findings in both human and veterinary medicine."

The report urges increased veterinary medical research to speed solutions to cancer, heart disease, and other ailments shared by man and animals. "The U.S. Government has hardly begun to capitalize on the opportunity for cross-seeding research findings between animal and man," Senator Humphrey states. The report is the first ever made of government-wide activities in veterinary medicine.

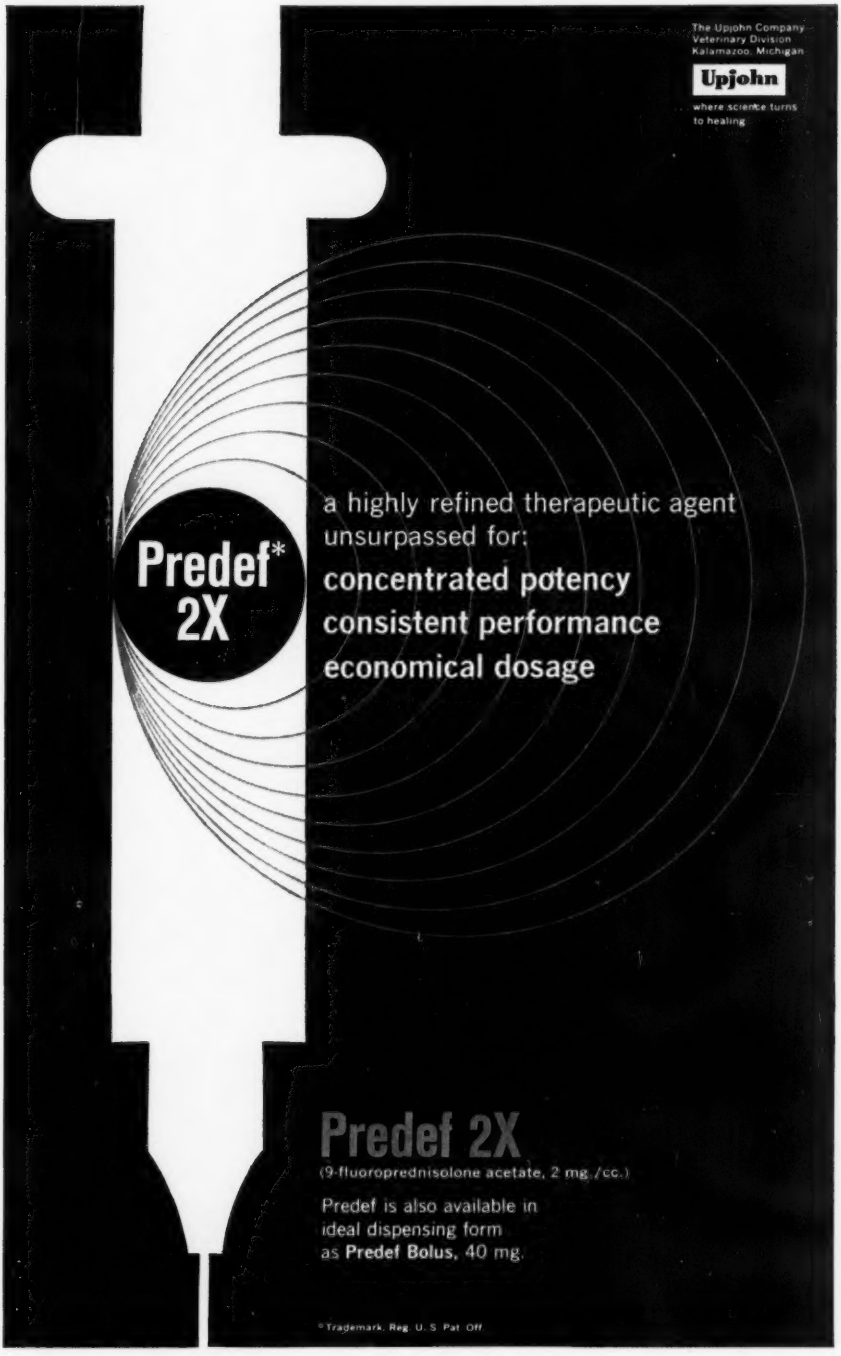
Veterinary medicine's status as a full-fledged health profession, its significant contributions to medical and scientific research, and its importance to the American people (most laymen, the report indicates, may think veterinary medical science concerns only agriculture) are pointed out in the report, which contains several graphic illustrations of its main points.

Senator Humphrey points out that some of the greatest chapters in biomedical discovery affecting man had their origin in veterinary science. Although its activites in the field of agriculture protects animals and products valued at $50 billion and has reduced ravages of animal and poultry diseases to a level of about $2.7 billion annually, veterinary medicine has other important roles to play. "The multi-billion dollar federal expenditure for man-in-space experiments hinges in considerable part on the research role of animals-in-space," the report says.

The report forcefully states veterinary medicine's aims and accomplishments and supports the AVMA's efforts to gain public recognition of the profession's status.

Everybody concerned with the progress of veterinary medicine and with its standing in the community should be thoroughly familiar with the Humphrey Report.

H. R. KUEHN
Director, Public Information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Coming Meetings

Notices of coming meetings must be received 30 days before date of publication.

November, 1961

Mississippi Valley Veterinary Medical Association. Hotel Pere Marquette, Peoria, Ill., Nov. 1-2, 1961. Dr. R. C. Williams, 3721 Fifth Ave., Moline, Ill., secretary.

Associations of Military Surgeons of the United States. 68th annual meeting. Mayflower Hotel, Washington, D.C., Nov. 6-8, 1961. Col. Robert E. Bitner, Suite 716, New Medical Bldg., 1726 Eye Street, N.W., Washington 6, D.C., secretary.

Michigan Nucleonic Society. Detroit, Mich., Nov. 10, 1961. Dr. L. E. Preuss, Department of Physics, Edsel B. Ford Institute for Medical Research, Henry Ford Hospital, Detroit 2, Mich., chairman.

American Public Health Association. 89th annual meeting. Cobo Hall, Detroit, Mich., Nov. 13-17, 1961. Dr. Berwyn F. Mattison, American Public Health Association, 1790 Broadway, New York 19, N.Y., executive director.

Arizona Veterinary Medical Association. Annual meeting. Pioneer Hotel, Tucson, Ariz., Nov 26-28, 1961. Dr. C. E. McGlamery, 3627 E. Grant Rd., Tucson, Ariz., publicity chairman.

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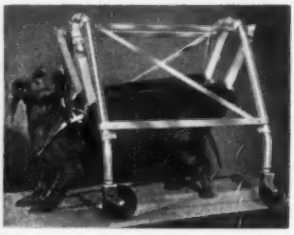

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American Animal Hospital Association. Regional Meetings. Dr. Frank R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind., executive secretary.

Region 2. Hotel Patten, Chattanooga, Tenn., Feb. 11-12, 1962.

Region 3. Hotel President, Kansas City, Mo., Oct. 19, 1961. Burlington Hotel, Burlington, Iowa, Nov. 15-16, 1961. Secor Hotel, Toledo, Ohio, March 26-27, 1962.

Region 4. Mayo Hotel, Tulsa, Okla., Jan. 20, 1962. Texas Hotel, Fort Worth, Texas, Feb. 4, 1962. Colorado State University, Fort Collins, Colo., Feb. 18, 1962.

Region 5. Sheraton Meeting House, Honolulu, Hawaii, May 16-17, 1962.

December, 1961

American Association of Equine Practitioners. 8th annual meeting. Hotel Texas, Fort Worth, Texas, Dec. 3-5, 1961. AAEP, 531 Guaranty Bank Bldg., Denver 2, Colo.

Kentucky Veterinary Medical Association. Annual meeting. Kentucky Hotel, Louisville, Ky., Dec. 4-5, 1961. Dr. L. S. Shirrell, 545 E. Main St., Frankfort, Ky., secretary.

Nebraska Veterinary Medical Association, Inc. Annual convention. Hotel Cornhusker, Lincoln, Neb., Dec. 5-7, 1961. Mr. Bob Garey, Office Rooms 418-419, Hotel Clarke, Hastings, Neb., executive secretary.

January, 1962

Cornell University. Conference for Veterinarians. Cornell University, New York State Veterinary College, Ithaca, N.Y., Jan. 10-12, 1962. Dr. Peter Olafson, Department of Pathology, Cornell University, Ithaca, N.Y., program chairman.

Michigan State University. Thirty-ninth annual Postgraduate Conference for Veterinarians. College of Veterinary Medicine, Michigan State University, East Lansing, Mich., Jan. 17-19, 1962. Dr. W. W. Armistead, dean.

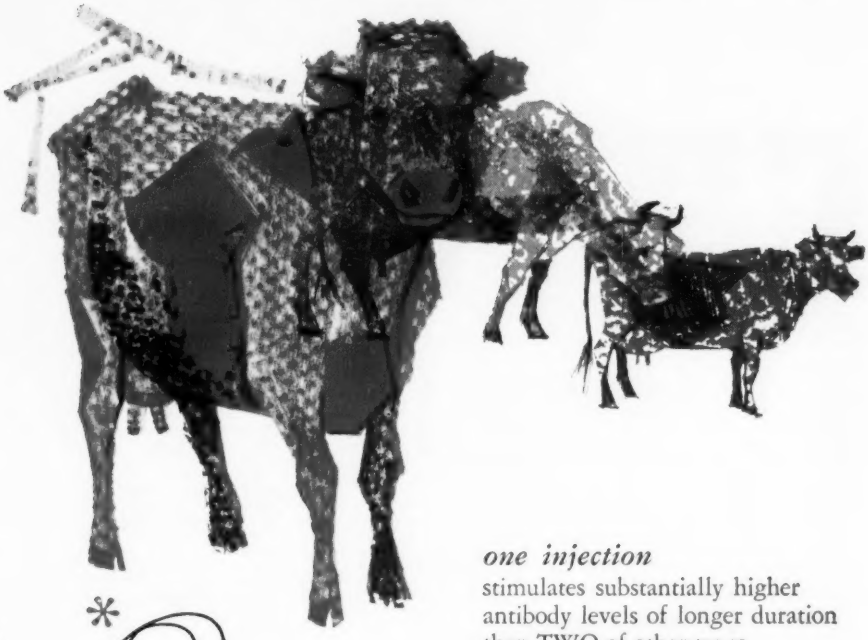
Tennessee Veterinary Medical Association. Annual meeting. Dinkler-Andrew Jackson Hotel, Nashville, Tenn., Jan. 21-23, 1962. Dr. H. W. Hayes, 5009 Clinton Pike, Knoxville, Tenn., secretary.

Oklahoma Veterinary Medical Association. Annual meeting. Mayo Hotel, Tulsa, Okla., Jan. 21-23, 1962. Dr. W. D. Speer, 538 S. Madison, Tulsa, Okla., secretary.

Minnesota Veterinary Medical Association. Annual meeting. Hotel St. Paul, St. Paul, Minn., Jan. 22-24, 1962. Dr. B. S. Pomeroy, 1443 Raymond Ave., St. Paul 8, Minn., secretary.

Intermountain Veterinary Medical Association. Annual meeting. Newhouse Hotel, Salt Lake City, Utah, Jan. 24-27, 1962. Dr. Bert Reinow, Box 277, Pinedale, Wyo., president.

(*Continued on page* 1042)



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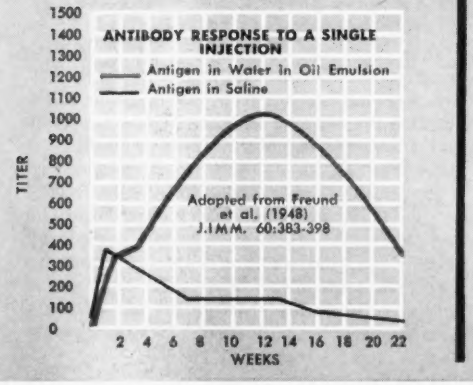

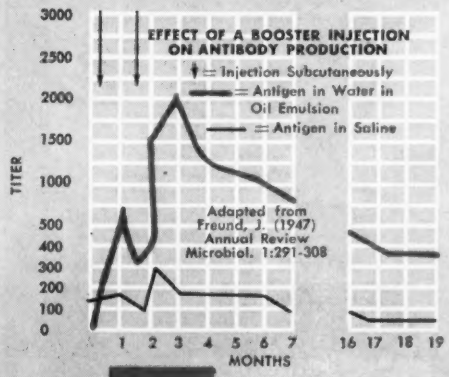

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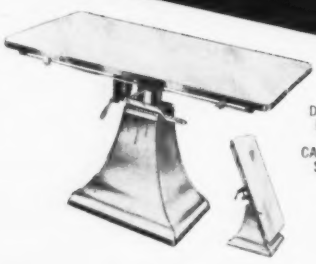

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Meetings—continued from p. 1040.

Kansas Veterinary Medical Association. Annual meeting. Broadview Hotel, Wichita, Kan., Jan. 29-31, 1962. Dr. M. W. Osburn, 1525 Humboldt, Manhattan, Kan., executive secretary.

February, 1962

Nevada State Veterinary Association. Annual winter meeting. Holiday Hotel, Reno, Nev., Feb. 12-13, 1962. Dr. Brian L. Hutcherson, 300 Kietzke Lane, Reno, Nev., secretary.

Arkansas Veterinary Medical Association. Forty-fifth annual meeting. Hotel Marion, Little Rock, Ark., Feb. 18-20, 1962. Dr. T. D. Hendrickson, 7824 Cantrell Rd., Little Rock, Ark., secretary.

August, 1962

American Veterinary Medical Association. Ninety-ninth Annual Meeting. Fontainebleau Hotel, Miami Beach, Fla., Aug. 12-16, 1962. Dr. H. E. Kingman, Jr., 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.

Foreign Meetings

Twelfth World's Poultry Congress. Show Grounds of the New South Wales Royal Agricultural Society, Sydney, Australia, Aug. 13-18, 1962. Dr. Cliff D. Carpenter, chairman, U.S. Participation Committee, 1207 Emerald Bay, Laguna Beach, Calif.; Dr. A. William Jasper, secretary, c/o AFBF, 2300 Merchandise Mart, Chicago 54, Ill.

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In another instance, a little girl took a rubber band and some paper clips from the receptionist's desk and amused herself by shooting the clips out the window. One clip tore into someone's eyeball. The doctor was forced to make a substantial out-of-court settlement.—*Veterinarian, Massachusetts Vet. A. (Jan., 1961): 14.*

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Wanted—veterinarians for full-time state meat inspection positions in Washington. Positions are on contract basis with State Department of Agriculture. Remuneration—$514 per month plus additional fees for bangs testing and blood sampling of slaughter animals under Brucellosis Market Testing Program. For complete information address Supervisor, State Meat Inspection, Animal Industry Division, State Department of Agriculture, P. O. Box 120, Olympia, Wash.

(Continued on Page 1046)

Instructions to Authors

JOURNAL *of the AVMA*

1) *Exclusive Publication*: Articles submitted for publication in the JOURNAL of the AVMA are accepted with the understanding that they are not being offered for publication elsewhere.

2) *Manuscripts*, including footnotes, references, tables, and legends, must be typewritten, double-spaced, on 8½- by 11-inch bond paper, and the original and one carbon copy should be submitted. One-inch margins should be allowed on the sides with 2-inch margins at the top and bottom. Articles should be concise.

Purpose of the article should be stated in the introduction. Summary should be included.

3) *References* to published works should be brief and limited strictly to what is relevant to satisfactory exposition of the author's own work. Reference names are not permitted in the text of the article. Persons cited are to be referred to by superscript numbers only, relating to the reference list at the end of the article.

References should be typed double-space, in alphabetical order by author, as follows: author(s), title, periodical name, volume, year, and page(s).

[8]Mansson, J., and Obel, N.: The Technique of Adrenalectomy in the Ruminant. Cornell Vet., 48, (1958): 197-201.

When books are cited, name of publisher, location, edition, year of publication, and pages concerned should be given.

[1]Arey, L. B.: Developmental Anatomy. 5th ed. W. B. Saunders Co., Philadelphia, Pa. (1946): 236-240.

4) *Tradenames* of products are avoided in the text of the article. Use only generic or chemical names. The tradename may be included in a footnote along with name and location of producer (composition of product may be included if necessary): e.g., ". . . piperazine citrate* . . ." Footnote: *Piperol, Carson Chemicals, New Castle, Ind.

5) *Arabic numerals* should be used wherever digits are needed throughout the article except at the beginning of a sentence.

6) *Abbreviations* for weights and measures as given in standard dictionaries are usually acceptable, but some are determined by AVMA editorial preferences: e.g., Gm., gr., kg., cc., mg., cmm., Gm./kg., μg., mg./100 ml. Other abbreviations should be explained the first time they are mentioned either in parentheses or footnotes: e.g., ". . . pregnant mare's serum gonadotrophin (PMSG). . ."

7) *Photographs* should be furnished in glossy prints. Identifying arrows, letters, etc. within photographs should be clearly defined. All illustrations should bear the author's name, illustration number, and "top" side indication.

8) *Drawings*, graphs, and charts should be clear and large enough to allow for possible reduction in size. A glossy print should be submitted if possible.

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Dose D.N.P. milligrams per pound body weight	Eggs per gram feces Pretreatment	Post	Worms at Necropsy	Per cent Reduction
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Dose D.N.P. milligrams per pound body weight	Eggs per gram feces Pretreatment	Post	Worms at Necropsy	Per cent Reduction
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Classified ads — Continued from page 1043.

Wanted—associate veterinarian for modern small animal hospital in Westchester County, N. Y. State background, experience, and salary required. Address Box K 52, JOURNAL of the AVMA.

Wanted—veterinarian or graduate with advanced veterinary training and technical writing and editing experience to prepare veterinary manuscripts for publication and answer requests for veterinary information. Will also abstract veterinary reports and write technical manuals. This professional opportunity exists in Scientific Information Division of Research Department of pharmaceutical firm located in Central New York State. Company offers up-to-date salary and fringe benefit program. Qualified applicants please forward resumes to Professional Employment Manager, The Norwich Pharmacal Company and Eaton Laboratories Division, Norwich, N. Y.

Wanted—ambitious veterinarian to assist in busy small animal practice in Long Island, N. Y. Permanent position with future possibility of partnership for right man. Must have New York license. Give age, experience, school, marital status, salary desired. Address Box K 13, JOURNAL of the AVMA.

Wanted—veterinarian for 6 months to 1 year for small animal practice in Long Island. Must have New York license. State qualifications. Address Box K 11, JOURNAL of the AVMA.

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Wanted—graduate veterinarian with New York State license or eligibility for such license for attractive civil service opening in public health field. Annual salary increments, liberal sick leave, vacation, and retirement plans. From 1 to 3 years' health work may qualify applicant to start at $7,470 per annum. Address Dr. Warren Winkelstein, Deputy Commissioner of Health, County of Erie, 601 City Hall, Buffalo, N. Y.

Wanted—associate veterinarian for small animal hospital in Westchester County, N. Y. Top salary and excellent working conditions. Address Box J 16, JOURNAL of the AVMA.

Wanted—associate veterinarian, preferably with experience in laboratory work, for AAHA hospital in Missouri. Complete details in first letter. Address Box L 17, JOURNAL of the AVMA.

Wanted—veterinarians interested in teaching and research in physiology or pharmacology at a veterinary college. Opportunities for graduate work. Address Box L 16, JOURNAL of the AVMA.

Wanted—veterinarian with experience in large animal practice and research to head Large Animal Clinical Research Section of Veterinary Division, establishing clinical research projects in veterinary schools, experiment stations, and with private practitioners; also collecting, analyzing and evaluating data, etc. Position located at company's main research facilities in Central New York State community of 10,000. We invite applicants to forward resume to Professional Employment Manager, The Norwich Pharmacal Company and Eaton Laboratories Division, Norwich, N. Y.

Wanted—energetic young veterinarian with California license to assist in small animal practice in Southern California. Top salary and commission leading to partnership or sale in future. Address Box L 11, JOURNAL of the AVMA.

Wanted—associate veterinarian with experience for dairy practice located in southern tier of New York State. Future partnership possibilities. Address Box L 7, JOURNAL of the AVMA.

Wanted—Positions

Veterinarian with M.S. degree in small animal medicine and surgery and experience in germ-free technology desires a position in industry or education. 2 years' experience in small animal practice. Military obligation completed. Address Box L 8, JOURNAL of the AVMA.

English graduate, 2 years' mixed practice, seeks position in modern mixed practice preferably with some horse work. Address Box K 61, JOURNAL of the AVMA.

Veterinarian, completing military obligation in March, 1962, desires position in small animal or mixed practice in Pennsylvania with option of partnership or purchase. Nine months' experience in small animal practice. Address Box L 20, JOURNAL of the AVMA.

Recent graduate desires position in small animal or mixed practice (with 50% small animal). Prefer Midwest. Experienced in mixed practice. Address Box L 13, JOURNAL of the AVMA.

Recent graduate with 2 years' experience in large AAHA hospital desires position, lease, or purchase of small animal hospital in East or Southeast. Address Box L 12, JOURNAL of the AVMA.

Wanted—assistantship leading to partnership or ownership in predominantly dairy cattle practice. 1955 graduate, age 33, married. Please state salary and working conditions. Address Box L 6, JOURNAL of the AVMA.

General practitioner, age 42, wishes to bring knowledge and ability to industry in field of technical journalism or technical service representative. Address Box L 2, JOURNAL of the AVMA.

Veterinarian (OSU '58), AAHA experienced, desires association with progressive small animal hospital in Midwest after January 1. Address Box K 9, JOURNAL of the AVMA.

Veterinarian's assistant and receptionist, thoroughly experienced, excellent references, wants live-in position. Widow, aged 45, salary wanted—$50 per week. Prefer southern location. Address Mrs. Cecil M. Cross, General Delivery, Jonesboro, Ark.

For Sale or Lease—Practices

For sale—Colorado mixed practice; completely equipped large and small animal hospital on 2 acres. $40,000 with $10,000 to handle. Address Box K 57, JOURNAL of the AVMA.

For lease with option to buy—mixed practice in southern Missouri. Residence, hospital, drugs and equipment. Annual gross more than $30,000. Owner leaving for institutional work. No capital needed. Address Box K 6, JOURNAL of the AVMA.

For sale or lease—well-established mixed practice in southern Ontario near large city. 1960 gross—$40,000. 60% small animal, 40% large. Includes modern small animal hospital with 40 cages. New 4-bedroom house adjoining available, if desired. Priced for quick sale. $10,000 will handle. Address Box L 1, JOURNAL of the AVMA.

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For sale—mixed practice on beautiful Whidby Island, Wash., for someone interested in semi-retirement. Good fishing and hunting. Clinic fully equipped. Five-room modern house; 5 acres. $6,000 down. Address Box L 4, JOURNAL of the AVMA.

For sale or rent—established Wisconsin dairy and mixed practice. Address Box L 9, JOURNAL of the AVMA.

For sale—Ohio small animal hospital. Long-established, modern, fully-equipped, including x-ray and drugs. 30 cages. Gross—$35,000. Price—$40,000; $10,000 down, balance 5% for 15 years. Address Box L 18, JOURNAL of the AVMA.

For sale—well-established, well-equipped small animal practice in Long Island, N. Y. Good opportunity for 2 men. Must have $50,000. Will consider 1 man on a 3-to-5 year partnership basis with $35,000 if he is energetic, ambitious, has good executive ability, and feels capable of buying out practice in that time. Address Box K 16, JOURNAL of the AVMA.

For sale—1-year-old modern small animal hospital in Southern California. Priced at value of real estate and equipment, all new. Low down, liberal terms. Address Dr. C. M. F., 2363 W. Commonwealth Ave., Fullerton, Calif.

For sale or lease—new small animal hospital in Kansas netting $15,000 to $20,000. Leaving for other interests. Address Box J 14, JOURNAL of the AVMA.

For sale—large animal practice in Southwestern Ontario. Gross—$35,000. Excellent opportunity for a 2-man practice. Address Box L 15, JOURNAL of the AVMA.

For sale or lease—small animal hospital in central Kansas. New hospital with first year gross of $30,000. Address Box L 21, JOURNAL of the AVMA.

For sale—mixed practice in Virginia. Equipped hospital with living quarters; 2-way radio. Well-established practice. Gross—$30,000. Priced reasonably. Terms. Address Box L 14, JOURNAL of the AVMA.

For sale or lease—northeastern Indiana hospital, fully-equipped for large and small animals including chute and x-ray. Good mixed practice netting more than $10,000. Available immediately. Large frontage on state highway. Address Kenneth Springer, Ossian, Ind., or Dr. K. M. Weinland, 327 W. Lutz Ave., West Lafayette, Ind.

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Wanted to buy—small animal hospital with equine work available. Prefer Vermont, New Hampshire, Pennsylvania, Maryland, or New Jersey. Good public schools essential. Address Box L 19, JOURNAL of the AVMA.

Wanted to buy or lease with option—Southern California small animal hospital. Will consider partnership. 13 years' experience. Replies kept confidential. Address Box L 10, JOURNAL of the AVMA.

Wanted—lucrative small animal hospital in San Francisco Bay area. Have substantial capital and 11 years' experience. Address Box L 3, JOURNAL of the AVMA.

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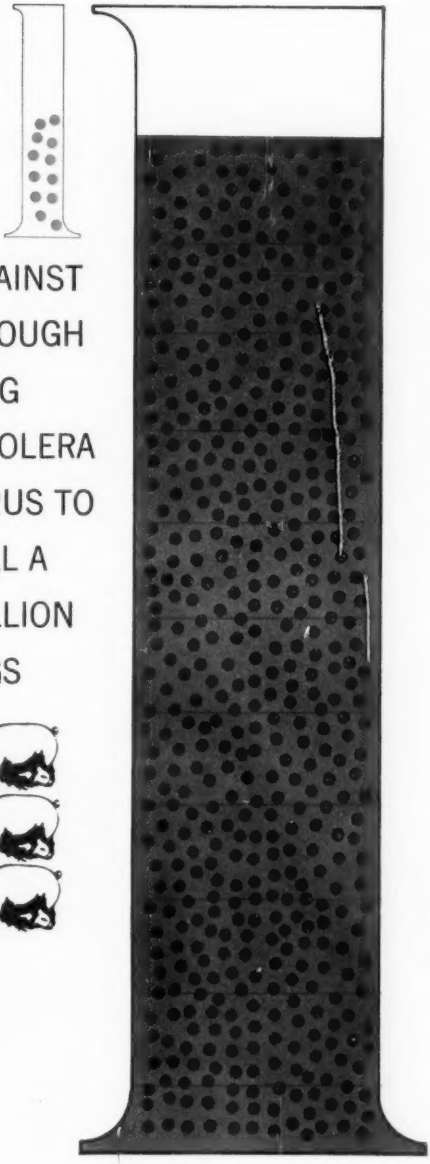

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modified live virus rabbit origin, vacuum dried

1. Newberne, J. W., *et al.*: Recent Studies on the Properties of a Nonvirulent Living Hog Cholera Vaccine, 62nd Annual Proceedings, U. S. Livestock Sanitary Association, 1958, pages 278-289.

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Clinical and Research References:

1. Sinha, S. K., et al, Studies on Canine Distemper Immunization with a Tissue Culture Vaccine. Vet. Med., Vol. 55, No. 4, April 1960.
2. Burgher, J. A., et al, The Immune Response of Dogs to Distemper. Cornell Vet., Vol. 48, No. 2, 1958.
3. Paton, I. M., et al, Progress in Distemper Immunization. Jen-Sal Small Animal Topics, August 1960.
4. Dept. of Biological Research, Jensen-Salsbery Laboratories. Unpublished Research Data.

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